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University of Nevada, Reno

**MicroRNA-10b downregulates KIT expression through NCOR2 in diabetic interstitial cells of Cajal**

A thesis submitted in partial fulfillment  
of the requirements for the degree of

Bachelor of Science in Neuroscience and the Honors Program

by

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**THE HONORS PROGRAM**

We recommend that the thesis  
prepared under our supervision by

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## Abstract

Interstitial cells of Cajal (ICCs) are pacemakers in the gastrointestinal (GI) tract that regulate intestinal motility through spontaneous electrical slow waves. ICCs have been shown to express the receptor tyrosine kinase c-Kit, which is the receptor for stem cell factor. While recent studies have found that reduction of c-Kit expression in ICC induces abnormal contractile patterns in the GI tract in diabetic mouse models, further investigation are still needed in order to address underlying mechanisms. MicroRNAs (miRNAs) are a new class of transcriptional regulators that are involved in nearly all developmental and pathological processes in animals. The specific goals of this research project were: (1) to identify miRNA profiles in ICC from jejunum and colon smooth muscle through genome-wide miRNA sequencing (miRNA-seq) technology in both non-diabetic and diabetic mouse models, and (2) to characterize gene functions encoded in these miRNA circuits using microRNA target validation and pathway analysis programs. Genome-wide miRNA-seq identified 11,381,897 to 19,938,908 raw reads in total for non-diabetic and diabetic ICC isolated from jejunum and colon smooth muscle. Interestingly, miR-10b-5p expressed the most change in diabetic ICC through its significant downregulation. Target genes for miR-10b-5p were identified using the five databases found in miRbase which include: DIANA-MICROT, MICRORNA.ORG, MIRDB, RNA22-MMU, and TARGETSCAN-VERT. A network was then graphically depicted in order to show gene relationships between diabetes mellitus, miR-10b and its gene targets, and c-Kit through the Ingenuity Pathway Analysis (IPA) program. From these two analyses, it was found that *Bcl2l1* and *Ncor2* were the most optimal target genes for miR-10b. Immunoblotting analysis showed that NCOR2 was clearly upregulated in diabetic smooth muscle, while BCL2L1 showed no expression in either diabetic or non-diabetic conditions. Finding novel molecular mechanisms relating to diabetic miRNAs could provide a better understanding of the disease, and may have significant therapeutic implications, especially in the prevention of ICC damage in patients with GI complications.

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## Introduction

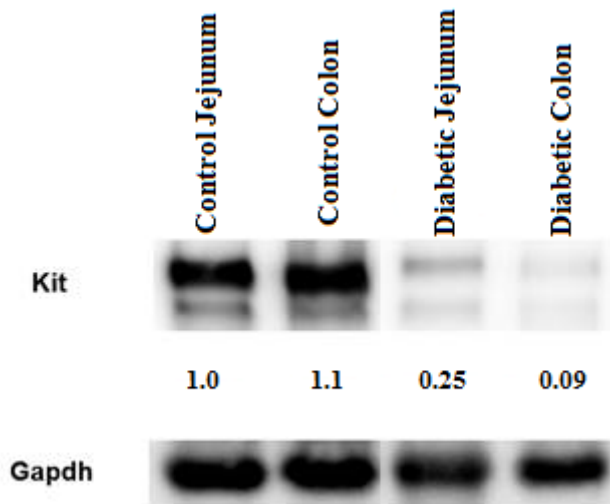
Diabetes mellitus is a medical disease that affects millions of people worldwide. It disables the body from producing sufficient amounts of insulin in order to regulate glucose levels. Diabetes takes on two primary forms: Type I diabetes occurs because of insufficient amounts of insulin production in pancreatic  $\beta$ -cells. Type II diabetes occurs because of insulin resistance that results in inadequate usage of insulin in the body (Che, Lan, Roukos, and Cho, 2014). By 2030, around 450 million individuals are expected to have diabetes with an estimated global economic cost of roughly \$500 billion per year (Wild, Roglic, Green, Sicree, and King, 2004).

Individuals with diabetes usually suffer from a variety of gastrointestinal (GI) disorders (Verne and Sninsky, 1998). These various complications could range from abdominal pain to dysphagia and many other symptoms (Bytzer et al. 2001; Feldman and Schiller, 1983). The GI tract is affected in the presence of diabetes in that its motility becomes irregular (Rothstein, 1990). Other abnormalities in the GI, such as poor glucose regulation and motor dysfunction have been demonstrated in the presence of this disorder (Jun, 2011).

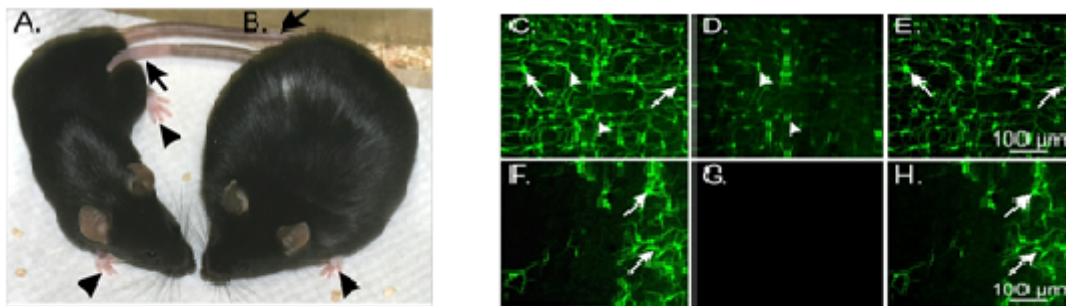
Interstitial cells of Cajal (ICCs) are pacemaker cells that play a very important role in the motility of the GI tract (Al-Sajee and Huizinga, 2012). ICCs regulate this motility through spontaneous electrical slow waves (Ward, Burns, Torihashi, and Sanders, 1994). Ward et al. (1994) have demonstrated that ICCs express the tyrosine kinase protein receptor c-Kit, which is the receptor for stem cell factor. Krihnamurthy et al. (2007) have also shown that c-Kit plays an important role in the regulation of glucose metabolism.

Previous data from Dr. Ro's laboratory showed that ICC and c-Kit were significantly lost in diabetic conditions (Figs 1 and 2). Other studies have also indicated that a decrease in ICC

expression can be seen in both diabetic mice and human models resulting from diminishing c-Kit levels (Forrest, Huizinga, Wang Liu, and Parsons, 2008; Iwakasi et al., 2006).



**Figure 1.** Preliminary data showing loss of c-Kit in colon and jejunum in diabetic conditions.



**Figure 2.** Preliminary data showing loss of ICC and c-KIT in the jejunum of diabetic mice (B, F-H) as opposed to the small intestine of wild type mice (A, C-E).

MicroRNAs (miRNAs) are small noncoding RNA molecules of 21-25 nucleotides that are involved in gene regulation (Liu et al., 2014). They can bind to the 3' untranslated region (UTR) of messenger RNAs (mRNAs), resulting in the inhibition of translation (Bartel, 2014). MiRNAs play pivotal roles in nearly all developmental and pathological processes in animals including: apoptosis, differentiation, and cell proliferation (Bartel 2014; Sempere et al., 2004; Ambros, 2004). Changes in miRNAs are linked to the emergence of numerous diseases, such as diabetes (Liu et al., 2014). With this, defective ICCs caused by miRNA regulation are likely to be involved in the occurrence of diabetes.

The specific goals of this research project were: (1) to identify miRNA profiles in ICC from jejunum and colon smooth muscle through genome-wide miRNA sequencing (miRNA-seq) technology in both non-diabetic and diabetic mouse models and (2) to characterize gene functions encoded in these miRNA circuits using microRNA target validation and pathway analysis programs. This is important as there is a lack of research relating to defective ICC pathways. Finding novel pathways relating to miRNAs and diabetes could provide a better understanding of the disease and may have significant therapeutic implications, especially in the prevention of ICC damage in patients with GI complications.

## **Literature Review**

This research project draws insights from comparing the roles of the regulation of miRNAs in the emergence of diabetes. For instance, Liu et al. (2014) have observed circulating levels of miR-126 in patients with Type II diabetes, as population-based data have revealed that miR-126 and Type II diabetes strongly interacted with each other. Similarly, Rong et al. (2013) have observed circulating levels of miR-146a in patients that have been recently diagnosed with

Type II diabetes. From past research, they have shown that miRNA-146a seemed to be involved in the expression of heme oxygenase-1 (HO-1), an enzyme that increases in new type 2 diabetes patients.

This research project differs from these two studies as Liu et al. focused more on miRNAs circulating in bodily fluids while Rong et al. focused more on miRNA interaction within endothelial cells. The focus of this study was to look for an influential miRNA in the dysregulation of the GI tract during diabetes. So far, miRNA GI research in diabetes is lacking, especially with a focus on ICC. Other studies tended to focus on the effects of compounds on the GI tract, rather than miRNAs themselves. For instance, Kim et al. (2011) have looked at levels of nitric oxide (NO) or carbachol in the long term dysfunction in the colons of diabetic mice, as NO is correlated with the relaxation of the smooth muscle in the GI tract (Ueno, Duenes, Zarroug, and Sarr, 2004). Others have also studied the role of acetylcholine in the regulation of GI motility (Huizinga, Change, Diamant, El-Sharkawy, 1984).

## **Materials and Methods**

### **Species (Mouse) and Tissue**

Small RNAs from the ICCs in the jejunum and colon of 60 age-matched control (non-diabetic) mice (labeled as ob/+) and 60 diabetic mice (labeled as ob/ob) were isolated and set for next-generation sequencing. The ICCs from the diabetic and control group tissues were also categorized and surveyed through Fluorescence-activated cell sorting (FACS). Protocols involving mice were handled according to procedures approved by the Institutional Animal Care and Use Committee at the University of Nevada, Reno.

### **MicroRNA sequencing analysis**

Raw reads from miRNA sequencing profiles that were obtained from the next-generation sequencing were normalized and filtered based on quality through alignment with a miRNA sequence database (miRbase). Comparative analysis of miRNA expression levels was done between the control and diabetic variants of mouse jejunum and colon ICC based on Fragments Per Kilobase of Exon Per Million Mapped Reads (FPKM) values. Also, A heat map macro for Microsoft Excel ('TSG-1.xls'!HeatMap.HeatMap) was used to complete the comparative analysis by converting the FPKM values on a log-scale. The log range of the heat map ranged from 0.1-5, covering an FPKM scope of 0 to 100,000. Bright red represents high expression of miRNAs, while bright green represents low expression of miRNAs.

### **MicroRNA target predictions**

Target genes for the most changed miRNA were identified using the five databases found in miRbase (mirbase.org). These databases included DIANA-MICROT, MICRORNA.ORG, MIRDB, RNA22-MMU, and TARGETSCAN-VERT. From the five databases, the top 100 genes were chosen and sorted according to gene scores. Predicted genes that matched with at least 2 databases were chosen as potential target gene candidates.

### **IPA analysis**

Pathway analysis was performed on the target gene candidates using the Ingenuity Pathway Analysis (IPA) program based on the most changed miRNA. Parameters that were set required that the gene candidate must be linked to diabetes mellitus and have an interaction with c-Kit. Candidates that met filter criteria and had at least one published evidence were deemed as

the target genes. A network was graphically depicted in order to show gene relationships between diabetes mellitus, miR-10b and its target genes, and c-Kit.

### **Western Blot Analysis**

Immunoblotting for protein expression analysis was performed based on the protocol described by Park et al. (2011). Of the total proteins, 20 µg were extracted from the small intestine or colon smooth muscle tissue lysates from the diabetic Kit<sup>+/copGFP</sup>;Lep<sup>ob/ob</sup> and WT Kit<sup>+/copGFP</sup> mice. These were then separated on 10% SDS-polyacrylamide gels and transferred to Trans-Blot Transfer Medium (Pure Nitrocellulose Membrane, Bio-Rad, Hercules). The membranes were blocked with 5% non-fat milk and incubated with goat anti-KIT (1:1000) (R&D Systems), rabbit anti-SMRTe (NCOR2), (1:100) (Santa Cruz Biotechnology), rabbit anti-Bim (BCL2L11), (1:100) (Santa Cruz Biotechnology), or rabbit anti-GAPDH antibody (1:1500) (Abcam). The protein–antibody complex was detected following incubation with the horseradish peroxidase-conjugated secondary antibodies (1:50 000) (Chemicon) using an enhanced chemiluminescence method (ECL Advantage, Amersham Bioscience). The protein bands were captured with a CCD-camera system (EC3 410 Imaging System, UVP Laboratory Products). The bands were also analyzed through VisionWorksLS software (Version 6.8, UVP Laboratory Products). The expression levels of NCOR2 and BCL2L11 were normalized to the ratio of NCOR2 and BCL2L11 and area density divided by GAPDH area density. For quantitative measurements, the values of relative expression for NCOR2 and BCL2L11 in small intestine and colon were compared to the expression in the wild type variant (set to 1.0).

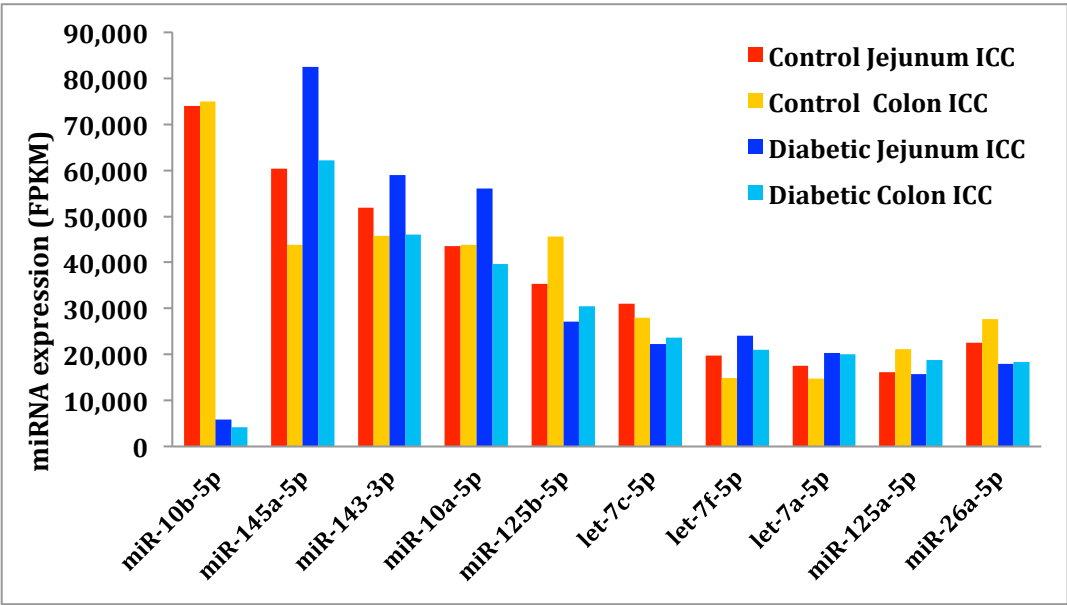
## Results

### microRNA sequencing analysis

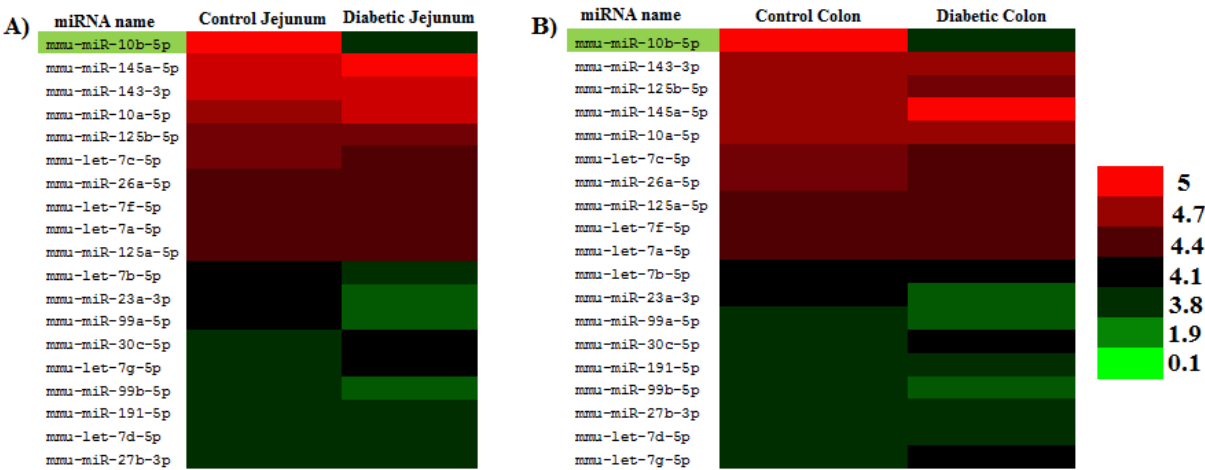
miRNA sequencing profiles of around 11 to 20 million raw reads were obtained from next-generation sequencing for the control and diabetic variants of colon and jejunum ICC (Table 1). Normalization of the raw reads and the use of the 'TSG-1.xls'!HeatMap.HeatMap macro in Microsoft Excel showed the miRNA expression levels in the control and diabetic variants of colon and jejunum ICC (Appendix). From the top 10 most expressed miRNAs, it was revealed that miR-10b-5p experienced the most change in expression levels in both tissue types when comparing diabetic and non-diabetic conditions (Fig 3). The heat map also showed that under diabetic conditions, miR-10b became most reduced in both tissues (Figs 4A and 4B.)

**Table 1. miRNA sequencing profiles of raw reads obtained from next-generation sequencing analysis in non-diabetic and diabetic mouse colon and jejunum tissue.**

Sample	Control Jejunum	Diabetic Jejunum	Control Colon	Diabetic Colon
<b>Number of reads</b>	13,237,163	19,938,908	11,844,268	11,381,897



**Figure 3. From the top 10 most expressed microRNAs in control (non-diabetic) and diabetic colon and jejunum samples, miR-10b-5p experienced the most change in expression levels.** Out of the 983 miRNAs expressions sequenced (Appendix) in control jejunum ICC (red), diabetic jejunum ICC (blue), control colon (orange), and diabetic colon (light blue), miR-10b expressed the most dramatic change out of all miRNAs. The miRNA expressions for miR-10b under non diabetic conditions were 74,026 in the jejunum and 74,958 in the colon ICCs. In diabetic conditions however, expression levels dropped to 5,818 in the jejunum and 4,134 in the colon ICCs.



**Figure 4. mmu-miR-10b-5p showed the most reduction in diabetic ICC.** Heat map analysis of the top 20 most expressed miRNAs in the jejunum (A) and colon (B) ICCs showed that miR-10b became severely downregulated in diabetic conditions. Expression levels for each miRNA were converted to a number between 0.01(lowest) to 5 (highest) on the heat map.

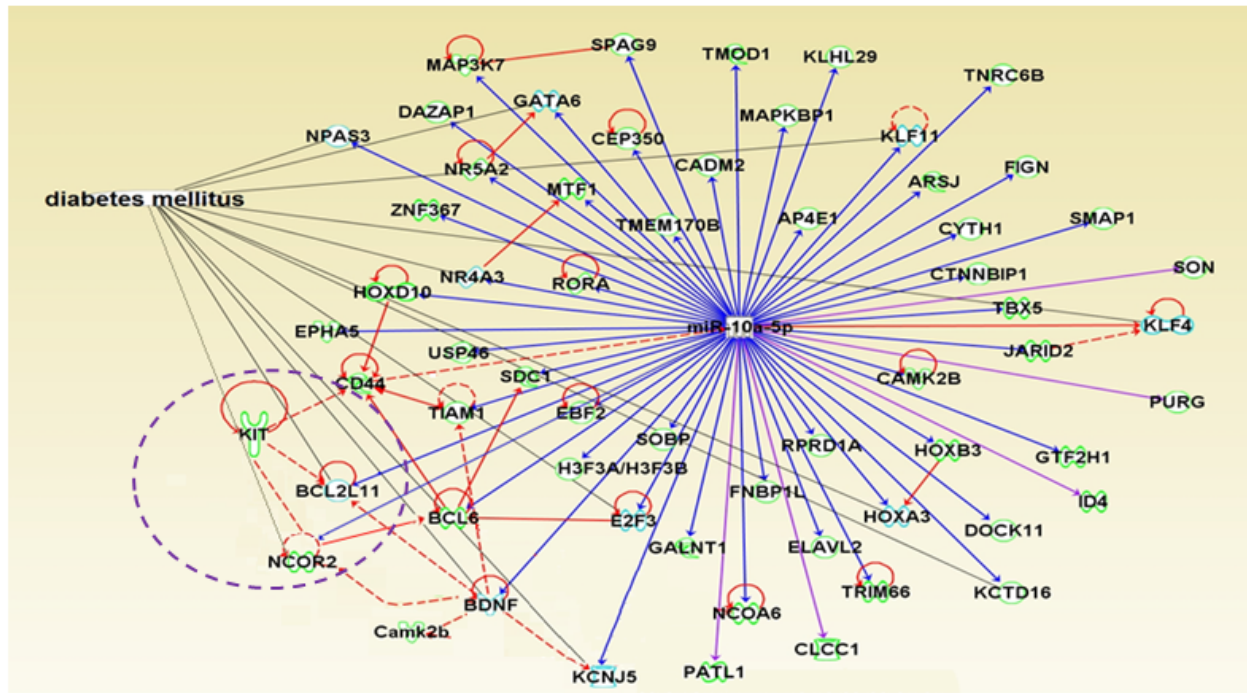


### **MicroRNA target predictions and IPA analysis**

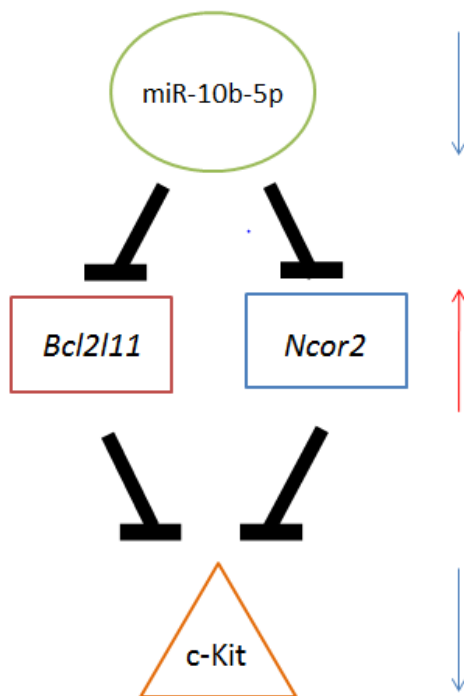
Through the use of 5 microRNA databases (DIANA-MICROT, MICRORNA.ORG, MIRDB, RNA22-MMU, and TARGETSCAN-VERT) found in miRbase, target genes were identified for miR-10b-5p. Of the top 100 genes based on the gene scores for each of the 5 databases, 75 genes matched with at least 2 databases (Table 2). Sorting of the predicted genes showed that 10 genes were predicted in 4 databases, 18 were predicted in 3 databases, and 47 were predicted in 2 databases. All these genes were used as potential candidate targets for miR-10b-5p. The candidate genes were imported to the Ingenuity Pathway Analysis Program (IPA) in order to obtain a pathway of which these genes interacted with miR-10b along with c-Kit and diabetes mellitus (Fig 5.). The IPA program reduced the 75 available target genes to 61, accounting for synonymous gene names. The IPA program also showed that BCL2L11 and NCOR2 were correlated with these parameters. From miRNA-sequencing and IPA analysis, we generated a figure for our expected model, stating that under diabetic conditions, the downregulation of miR-10b-5p upregulates Bcl2l11 and Ncor2, which downregulates c-Kit (Fig 6).

**Table 2. Most commonly predicted genes relating to miR-10b-5p among five microRNA databases.** Target genes for the most reduced miRNA (miR-10b-5p) were identified with the use of miRbase. To predict target genes, miRbase uses five other databases including: DIANA-MICROT, MICRORNA.ORG, MIRDB, RNA22-MMU, and TARGETSCAN-VERT. The top 100 genes, according to genes scores for each database were chosen. Predicted genes that match with at least 2 databases were sorted to be imported to the Ingenuity Pathway Analysis (IPA) program.

Predicted in 4 databases	Predicted in 3 databases	Predicted in 2 databases	
Hoxa3	Ncor2	Cadm2	Spag9
Bdnf	Bcl2l11	Rora	Athl1
Arsj	Gata6	Rc3h2	Kcnj5
Hoxb3	Sobp	Nr4a3	Tnrc6b
Ebf2	Elavl2	Smap1	Nr5a2
Fign	Tmod1	Mapkbp1	Ncoa6
Epha5	Shank3	Hs6st2	Cd44
Klhl29	C4a	Atad5	Son
Map3k7	Fnbp1l	Tmem20	Rpl31
Galnt1	Klf11	Cep350	Purg
	Camk2b	Zfp367	Npas3
	Dazap1	Mycs	Kctd16
	Rprd1a	Lcp2	Idh3a
	H3f3b	E2f3	Dock11
	Mybl1	Sdc1	Cyth1
	Clcc1	Id4	5830417I10rik
	Gpr174	Gtf2h1	Tmem170b
	Patl1	Pgm3	Tbx5
		Airn	Usp46
		Kif18a	Mtf1
		Trim66	Ctnnbip1
		Jarid2	Bcl6
		Mrps18c	Ap4e1
		Tiam1	



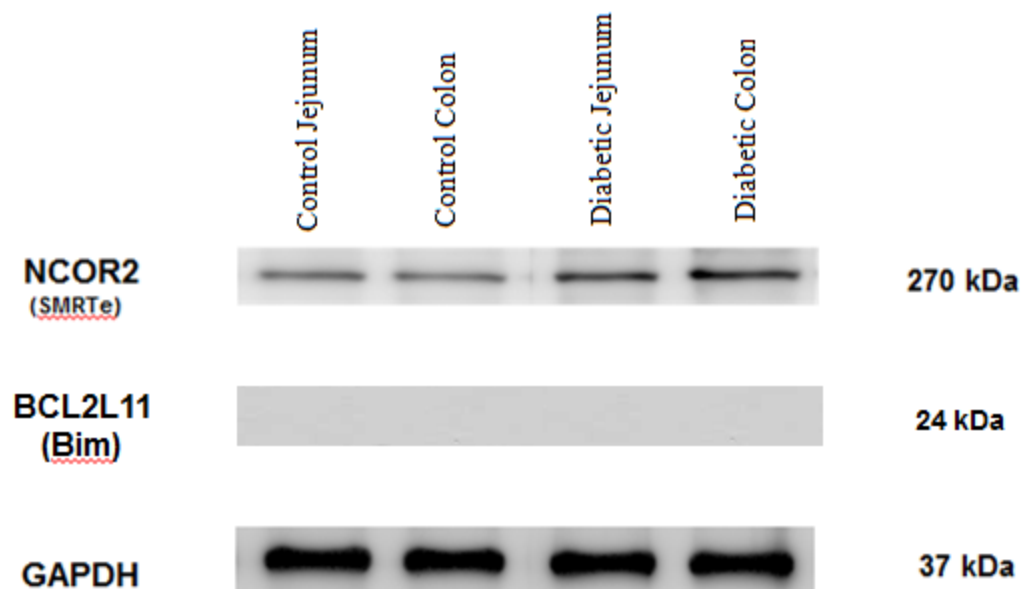
**Figure 5. BCL2L11 and NCOR2 network both miR-10b-5p and KIT in diabetes mellitus.** The Ingenuity Pathway Analysis (IPA) program was used in order to find a pathway among the target genes and miR-10b-5p that can interact with c-Kit.



**Figure 6. Under diabetic conditions, the downregulation of miR-10b-5p upregulates Bcl2l11 and Ncor2, which downregulates c-Kit.** This is the proposed pathway that links miR-10b-5p to diabetes, based from miRNA and gene analysis under diabetic conditions.

## Western Blot Analysis

To verify our expected model's prediction based on miRNA-sequencing and IPA analysis, we conducted Western blots from jejunum and colon tissue samples in order to see if BCL2L11 and NCOR2 will indeed be highly expressed in diabetic conditions. Interestingly, NCOR2 was clearly upregulated in diabetic tissue, as was seen in the darker bands (almost twice as dark as compared to control) for diabetic colon and jejunum ICC (Fig 7.). NCOR2 functions as a transcriptional repressor and its upregulation in diabetic conditions could be linked in the repression of transcription that is related to the downregulation of c-Kit in diabetic ICC (see Discussion for more details). However, immunoblotting analysis of BCL2L11 and NCOR2 differed greatly in results. Under diabetic conditions, BCL2L11 was not detectable through Western blotting for both control and diabetic tissue samples, as concentrations were too low to be visible.



**Figure 7. NCOR2 is upregulated in diabetic jejunum and colon tissue as seen in the darker bands for diabetic jejunum and colon, while BCL2L11 was not detected. GAPDH was used as a loading control and standard for the signal of interest for the western blot.**

## Discussion

Next-generation sequencing analysis of diabetic jejunum ICC, wild type jejunum ICC, diabetic colon ICC, and wild type colon ICC in the 120 total mice sample revealed that miR-10b-5p had experienced the most change in expression levels. miR-10b-5p became the most reduced miRNA in diabetic conditions for both jejunum and colon ICC. This result is significant as miR-10b is normally dominantly expressed in wild type jejunum and colon ICC. Diabetic conditions showed phenotypic change in ICC expression through its loss, along with the reduction of miR-10b-5p. The downregulation of miR-10b coincides with the result of Agrawal et al. (2014), as they also saw the downregulation of miR-10b-5p under hypoxic conditions. According to Arden and Sivaprasad (2011) hypoxia is related to the emergence of diabetic conditions. This study also coincides with the results of Herrera et al. (2010) with the downregulation of miR-10b-5p in diabetic skeletal muscle, showing the contribution of miR-10b-5p in the pathophysiology of diabetic conditions.

Gene analysis of miR-10b-5p yielded 2 potential targets which included Bcl2l1 and Ncor2. Bcl2l1 encodes Bim, a known apoptosis-inducing protein (Guerrero, Dong, Zhao, Lau-Kilby, and Tarbell, 2014). BCL2L1 induces apoptosis when it binds to pro-survival proteins of the Bcl-2 family through the release of Bak or Bax proteins (Ewings, Wiggins, and Cook, 2007). However, our immunoblotting analysis showed that BCL2L1 was not detected under diabetic conditions as its concentrations were too low to be visible. This indicates that loss of ICCs through the downregulation of miR-10b may not be occurring because of an apoptotic pathway.

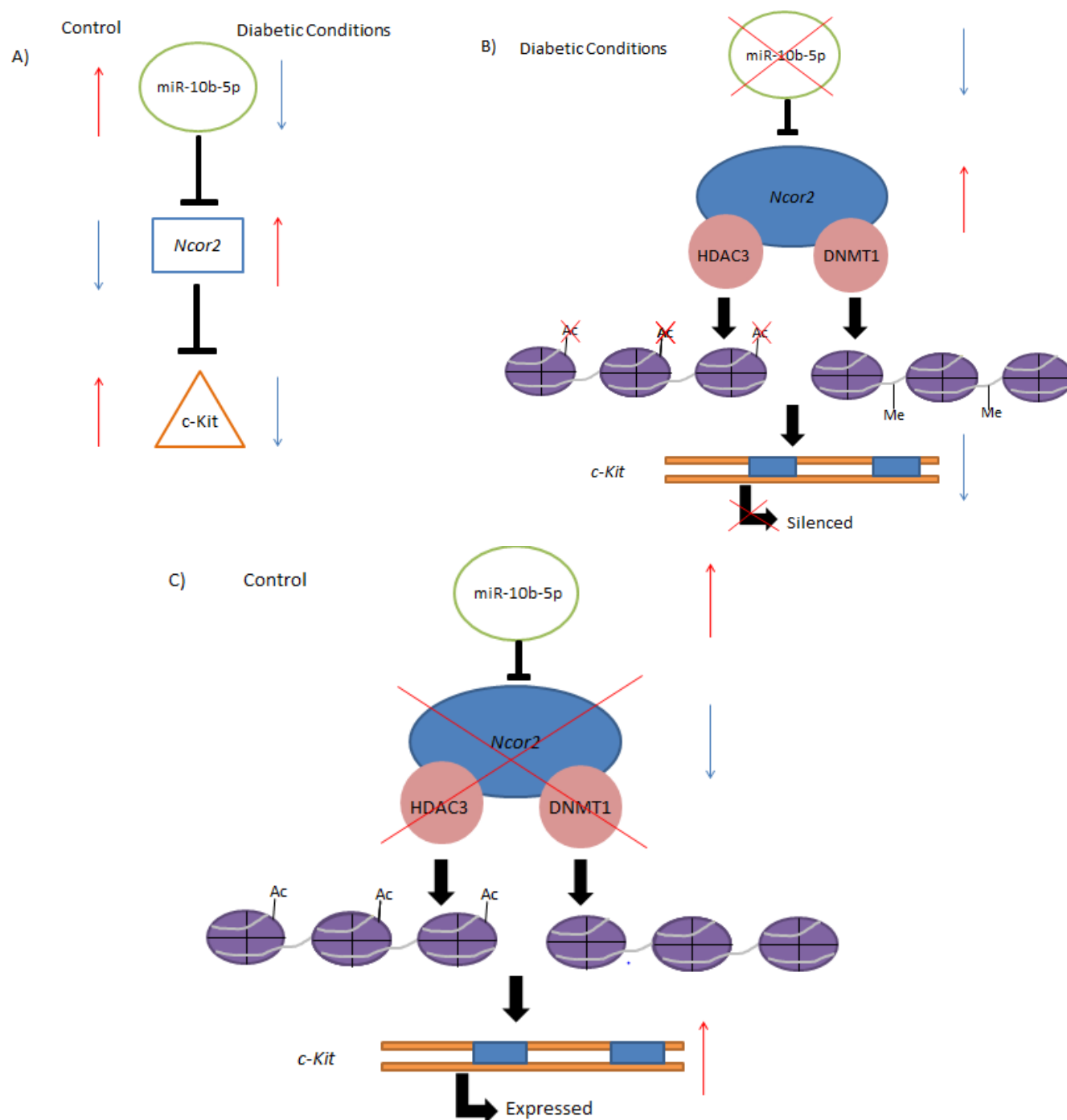
NCOR2 on the other hand interestingly showed definite upregulation in diabetic tissue. This coincides with the observations of Mottis, Mouchiroud and Auwerx (2013) in NCOR2's

regulatory functions, ranging from genomic stability, carcinogenesis, and metabolism such as seen in Type II diabetes. NCOR2 is a transcriptional coregulator that carries multiple independent repression domains (Chen and Evans, 1995). This corepressor aids in the recruitment of histone deacetylases to DNA promoters bound by interacting target transcription factors (Nagy, et al., 1997). Essentially, deacetylation takes out acetyl groups from histone tails, making them wrap and compress around the DNA. This interferes with the transcription of genes as it blocks access of transcription factors. Histone deacetylation results in a reduction of gene expression.

Multiple studies have observed the interaction between NCOR2 and HDAC3 (Fischle et al., 2002; Yoon, Chan, Reynolds, Qin, and Wong, 2003). According to Perissi et al. (2010), HDAC3 seems to be the main enzyme that is responsible for the repressive activity of NCOR2 with its stability and ability to reproduce with the protein.

Other studies have also observed the interaction between NCOR2 and DNMT1 suggesting that NCOR2 might employ some of its repressing activity through the modification of target expression by the methylation of DNMT1 (Sajedi et al., 2008). DNMT1 is an enzyme that regulates tissue-specific patterns of methylation in cytosine residues that also interacts with HDAC3 (Klein et al., 2011; Sarkar et al., 2011).

From this, we proposed a new expected model that occurs in diabetic ICC with miR-10b-5p. Essentially, with the downregulation of miR-10b-5p and upregulation of NCOR2, NCOR2 recruits HDAC3 which leads to the methylation of DNMT1, resulting in the repression of transcription that is related to the downregulation of c-Kit in ICC (Fig. 8).



**Figure 8. Proposed pathway of miR-10b-5p under normal and diabetic conditions along with the NCOR2 complex.** Our expected model (A) states that under normal conditions in ICC, miR-10b-5p is upregulated along with c-Kit expression, while Ncor2 is downregulated. In diabetic conditions, miR-10b-5p is downregulated along with c-Kit expression, while Ncor2 is upregulated. In diabetic conditions (B), the NCOR2 complex shows that the upregulation of NCOR2 recruits HDAC3 which leads to the methylation of DNMT1, resulting in the repression of transcription that is related to the downregulation of c-Kit in ICC. However, no deacetylation and methylation occurs in normal (control) conditions (C).

**Further Research**

Further research that can be done on this topic is to test the proposed elements of the pathway in human tissue and observe if the relationships that were seen in this study still hold true to test the proposed elements of the pathway in human tissue and observe if the relationships that were seen in this study still hold true. Also, more information is still needed in regards to the mechanisms of the NCOR2 complex. It is still unknown which transcription factor(s) help mediate the processes of the deacetylation and methylation that leads to the repression of transcription that is related to the downregulation of c-Kit in ICC. Finally, functional studies in regards to NCOR2 itself are still lacking and need further investigation.



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## **Appendix**

Supplementary material can be found in the CD that came along with this paper.

SI Table 1. miRNA expression levels in jejunum

miR_name	norm_ob-plus_SI	norm_ob-ob_SI
mmu-miR-145a-5p	60,351.54	82,514.18
mmu-miR-143-3p	51,897.07	58,959.23
mmu-miR-10a-5p	43,470.86	56,088.28
mmu-miR-125b-5p	35,341.92	27,115.36
mmu-let-7f-5p	19,745.48	24,010.55
mmu-let-7c-5p	31,090.86	22,221.50
mmu-let-7a-5p	17,541.13	20,358.63
mmu-miR-26a-5p	22,493.96	17,883.31
mmu-miR-125a-5p	16,211.82	15,770.23
mmu-miR-30c-5p	6,179.57	7,539.05
mmu-let-7g-5p	5,635.74	7,339.89
mmu-miR-10b-5p	74,026.07	5,818.52
mmu-let-7d-5p	4,852.31	5,551.35
mmu-miR-27b-3p	4,515.09	5,506.09
mmu-let-7b-5p	7,557.07	4,972.84
mmu-miR-191-5p	5,022.23	4,465.15
mmu-miR-145a-3p	2,797.92	4,445.12
mmu-miR-100-5p	4,405.70	4,034.56
mmu-miR-99b-5p	5,539.32	3,462.77
mmu-miR-23a-3p	6,925.72	3,283.02
mmu-let-7i-5p	3,774.00	3,225.03
mmu-miR-23b-3p	3,454.75	2,704.23
mmu-miR-24-3p	2,436.45	2,421.34
mmu-miR-99a-5p	6,761.90	2,365.76
mmu-miR-181a-5p	2,617.88	1,726.38
mmu-miR-541-5p	1,742.81	1,713.36
mmu-miR-30e-5p	645.83	1,582.18
mmu-miR-30d-5p	2,296.53	1,513.59
mmu-let-7e-5p	986.81	1,435.57
mmu-miR-143-5p	645.83	1,298.79
mmu-miR-378a-3p	1,028.77	1,184.30
mmu-miR-30a-5p	763.07	1,107.03
mmu-miR-26b-5p	1,031.38	1,093.84
mmu-miR-351-5p	241.80	1,031.42
mmu-mir-6240	342.28	1,028.42
mmu-miR-146a-5p	428.64	980.85
mmu-miR-22-3p	948.34	969.34
mmu-miR-127-3p	2,029.62	873.20
mmu-miR-486-5p	620.71	847.17
mmu-miR-365-3p	685.61	790.09
mmu-miR-30b-5p	925.66	694.29
mmu-miR-5099	560.00	684.94
mmu-miR-455-3p	1,060.34	635.88
mmu-mir-6236	815.41	600.83
mmu-miR-423-5p	418.69	576.79

mmu-miR-181b-5p	618.10	556.43
mmu-miR-16-5p	560.00	539.41
mmu-miR-342-3p	271.10	507.70
mmu-miR-7a-5p	324.66	430.43
mmu-miR-335-5p	454.28	426.59
mmu-miR-29a-3p	680.38	423.58
mmu-miR-7b-5p	295.00	397.71
mmu-miR-30a-3p	309.31	386.53
mmu-let-7j	402.99	383.03
mmu-miR-92a-3p	508.71	376.52
mmu-miR-3470b	117.76	370.51
mmu-miR-151-5p	510.81	354.49
mmu-miR-103-3p	368.10	352.82
mmu-miR-98-5p	338.30	349.91
mmu-miR-361-5p	317.16	336.46
mmu-miR-21a-5p	679.85	334.46
mmu-miR-320-3p	427.07	325.45
mmu-miR-322-3p	86.88	324.45
mmu-miR-148a-3p	423.40	299.41
mmu-miR-224-5p	280.52	283.39
mmu-miR-133a-3p	163.64	268.87
mmu-miR-30e-3p	154.92	254.35
mmu-let-7d-3p	319.25	235.32
mmu-miR-199b-3p	1,015.33	217.30
mmu-miR-3535	183.18	217.30
mmu-miR-186-5p	180.04	208.29
mmu-miR-652-3p	188.41	202.28
mmu-miR-328-3p	278.43	195.27
mmu-miR-152-3p	239.70	183.25
mmu-miR-148b-3p	94.73	183.25
mmu-miR-139-5p	251.22	175.24
mmu-miR-199a-5p	1,020.57	173.24
mmu-miR-708-5p	39.78	168.23
mmu-miR-690	86.79	154.41
mmu-miR-503-3p	20.93	153.21
mmu-mir-1954	41.35	149.21
mmu-miR-362-5p	184.23	148.20
mmu-mir-3535	151.78	147.20
mmu-miR-126a-3p	238.66	139.19
mmu-miR-744-5p	137.12	129.18
mmu-miR-221-3p	433.35	125.17
mmu-miR-1839-5p	77.46	125.17
mmu-miR-181d-5p	86.36	124.50
mmu-miR-434-3p	288.90	119.16
mmu-miR-151-3p	255.40	117.16
mmu-miR-6240	79.55	117.16
mmu-miR-15b-5p	112.00	113.16

mmu-miR-92b-3p	113.05	113.16
mmu-miR-27a-3p	122.99	112.66
mmu-miR-185-5p	50.24	112.15
mmu-miR-501-3p	172.71	111.15
mmu-miR-664-3p	108.86	111.15
mmu-miR-140-3p	142.36	110.15
mmu-miR-378c	119.15	109.32
mmu-miR-25-3p	208.30	109.15
mmu-miR-3968	62.28	108.15
mmu-miR-28a-3p	104.67	106.15
mmu-miR-450a-5p	24.07	106.15
mmu-miR-382-5p	198.88	103.14
mmu-miR-409-5p	197.83	102.14
mmu-miR-129-2-3p	96.30	102.14
mmu-miR-484	128.75	92.13
mmu-miR-490-3p	28.26	91.13
mmu-miR-146b-5p	104.15	89.62
mmu-mir-3470b	29.31	88.62
mmu-miR-149-5p	132.94	87.12
mmu-miR-125b-1-3p	88.97	84.12
mmu-let-7a-1-3p	90.72	84.12
mmu-let-7b-3p	116.19	81.11
mmu-miR-28c	65.94	78.11
mmu-miR-351-3p	9.42	76.10
mmu-miR-3963	40.30	74.10
mmu-miR-3470a	25.12	71.10
mmu-miR-1983	41.87	70.10
mmu-miR-221-5p	95.25	69.10
mmu-miR-330-3p	57.57	69.10
mmu-miR-222-3p	213.53	68.09
mmu-miR-423-3p	64.90	67.09
mmu-miR-195a-5p	135.03	66.42
mmu-miR-335-3p	205.16	66.09
mmu-miR-9-5p	62.80	65.09
mmu-mir-5098	23.03	61.58
mmu-miR-128-3p	64.90	60.08
mmu-miR-10a-3p	29.31	60.08
mmu-miR-615-3p	3.66	60.08
mmu-miR-125a-3p	45.01	59.08
mmu-miR-342-5p	18.84	58.08
mmu-miR-676-3p	118.28	55.08
mmu-miR-434-5p	102.58	53.07
mmu-miR-194-5p	129.80	51.07
mmu-miR-378d	39.78	50.07
mmu-miR-338-5p	38.73	50.07
mmu-miR-215-5p	96.30	50.07
mmu-miR-760-5p	32.45	50.07



mmu-miR-130a-3p	83.74	49.07
mmu-miR-5100	28.26	49.07
mmu-miR-374b-5p	64.90	48.07
mmu-miR-129-5p	52.34	47.06
mmu-miR-126a-5p	43.96	47.06
mmu-miR-542-3p	7.33	46.06
mmu-miR-379-5p	87.93	42.06
mmu-miR-1198-5p	35.59	42.06
mmu-miR-204-5p	117.23	40.06
mmu-miR-24-2-5p	23.03	40.06
mmu-miR-3068-5p	16.75	38.05
mmu-miR-1194	10.47	36.05
mmu-miR-132-3p	84.79	35.05
mmu-miR-1843b-5p	21.98	35.05
mmu-mir-3470a	19.36	35.05
mmu-miR-129-1-3p	11.51	34.05
mmu-miR-3472	7.33	34.05
mmu-miR-29b-3p	20.59	33.05
mmu-miR-872-5p	35.59	33.05
mmu-miR-218-5p	12.56	32.04
mmu-miR-34c-5p	64.90	31.04
mmu-miR-101a-3p	44.49	31.04
mmu-miR-107-3p	23.38	30.71
mmu-miR-30c-2-3p	26.17	30.04
mmu-miR-409-3p	56.52	29.04
mmu-miR-485-5p	36.64	29.04
mmu-miR-30b-3p	16.75	29.04
mmu-miR-433-3p	66.99	28.04
mmu-miR-212-5p	46.06	28.04
mmu-miR-329-3p	64.90	27.04
mmu-miR-425-5p	33.50	27.04
mmu-miR-192-5p	240.75	26.04
mmu-miR-543-3p	55.48	26.04
mmu-miR-139-3p	18.84	26.04
mmu-miR-340-3p	10.47	26.04
mmu-miR-1981-5p	46.06	25.03
mmu-miR-329-5p	48.15	24.03
mmu-miR-3068-3p	13.61	24.03
mmu-miR-93-5p	12.56	24.03
mmu-miR-674-3p	31.40	23.03
mmu-miR-23b-5p	18.84	23.03
mmu-miR-1249-3p	23.03	22.03
mmu-miR-142-5p	11.51	22.03
mmu-miR-574-3p	240.75	21.03
mmu-miR-669c-5p	33.50	21.03
mmu-miR-7035-5p	2.09	21.03
mmu-miR-181a-2-3p	31.40	20.03

mmu-miR-1a-3p	7.33	20.03
mmu-miR-340-5p	10.47	20.03
mmu-miR-203-3p	54.43	19.03
mmu-miR-181a-1-3p	13.61	19.03
mmu-miR-1195	6.28	19.03
mmu-miR-674-5p	10.47	18.02
mmu-miR-709	9.42	18.02
mmu-miR-124-3p	31.40	17.02
mmu-miR-30c-1-3p	10.47	17.02
mmu-miR-703	1.05	17.02
mmu-miR-3473f	5.15	16.72
mmu-miR-872-3p	12.56	16.02
mmu-miR-1193-3p	19.89	16.02
mmu-miR-377-3p	17.79	16.02
mmu-miR-6538	24.07	16.02
mmu-miR-322-5p	5.23	15.02
mmu-mir-1194	1.05	15.02
mmu-mir-8111	2.09	14.52
mmu-miR-196a-5p	382.06	14.02
mmu-miR-10b-3p	117.23	14.02
mmu-miR-874-3p	11.51	14.02
mmu-miR-29c-3p	9.77	14.02
mmu-miR-181c-5p	9.42	14.02
mmu-miR-345-3p	10.47	13.02
mmu-miR-494-3p	13.61	13.02
mmu-miR-214-3p	130.84	12.02
mmu-miR-411-3p	45.01	12.02
mmu-miR-132-5p	13.61	12.02
mmu-miR-338-3p	6.28	12.02
mmu-miR-671-5p	4.19	12.02
mmu-miR-1843b-3p	7.33	12.02
mmu-miR-486-3p	5.23	11.52
mmu-miR-485-3p	38.73	11.02
mmu-miR-134-5p	31.40	11.02
mmu-miR-497-5p	11.51	11.02
mmu-miR-27b-5p	9.42	11.02
mmu-miR-361-3p	9.42	11.02
mmu-miR-410-3p	12.56	11.02
mmu-miR-29c-5p	8.37	11.02
mmu-miR-3057-5p	1.05	11.02
mmu-miR-450b-5p	0.01	11.02
mmu-miR-122-5p	198.88	10.01
mmu-miR-136-3p	39.78	10.01
mmu-miR-125b-2-3p	16.75	10.01
mmu-miR-323-3p	24.07	10.01
mmu-miR-155-5p	19.89	10.01
mmu-miR-378a-5p	10.47	10.01

mmu-miR-365-2-5p	3.14	10.01
mmu-miR-200b-3p	316.11	9.01
mmu-miR-200c-3p	93.16	9.01
mmu-miR-182-5p	64.90	9.01
mmu-miR-379-3p	14.65	9.01
mmu-miR-667-3p	31.40	9.01
mmu-miR-6516-5p	5.23	9.01
mmu-mir-1946b	6.80	9.01
mmu-miR-488-3p	1.05	9.01
mmu-miR-450b-3p	0.00	9.01
mmu-miR-467c-3p	1.05	9.01
mmu-mir-1195	3.14	9.01
mmu-miR-150-5p	26.17	8.01
mmu-miR-384-5p	7.33	8.01
mmu-miR-1943-5p	5.23	8.01
mmu-miR-505-5p	15.70	8.01
mmu-miR-29b-2-5p	5.23	8.01
mmu-miR-30d-3p	1.57	8.01
mmu-miR-677-5p	1.05	8.01
mmu-miR-669a-5p	11.51	7.76
mmu-miR-3473b	12.82	7.63
mmu-miR-540-3p	12.56	7.01
mmu-miR-411-5p	19.89	7.01
mmu-miR-1981-3p	9.42	7.01
mmu-miR-671-3p	11.51	7.01
mmu-miR-383-5p	11.51	7.01
mmu-miR-495-3p	12.56	7.01
mmu-miR-700-5p	11.51	7.01
mmu-miR-421-3p	3.14	7.01
mmu-miR-345-5p	9.42	7.01
mmu-miR-193a-5p	5.23	7.01
mmu-miR-148b-5p	4.19	7.01
mmu-miR-1940	4.19	7.01
mmu-miR-22-5p	2.09	7.01
mmu-let-7f-2-3p	5.58	7.01
mmu-miR-592-5p	0.00	7.01
mmu-miR-5119	0.00	7.01
mmu-miR-466i-5p	4.54	6.64
mmu-miR-6407	0.00	6.51
mmu-miR-1934-3p	4.71	6.43
mmu-miR-532-5p	26.17	6.01
mmu-let-7e-3p	16.75	6.01
mmu-miR-337-5p	15.70	6.01
mmu-miR-668-3p	16.75	6.01
mmu-miR-300-3p	11.51	6.01
mmu-miR-34b-3p	7.33	6.01
mmu-miR-106b-3p	7.33	6.01

mmu-miR-673-5p	3.14	6.01
mmu-miR-487b-3p	3.14	6.01
mmu-miR-5126	16.75	6.01
mmu-miR-672-5p	8.37	6.01
mmu-miR-6412	5.23	6.01
mmu-miR-369-3p	1.05	6.01
mmu-miR-25-5p	1.05	6.01
mmu-miR-546	3.14	6.01
mmu-mir-682	2.09	6.01
mmu-miR-98-3p	1.05	6.01
mmu-miR-466f-3p	2.09	5.51
mmu-miR-196b-5p	1,084.42	5.01
mmu-miR-200a-3p	70.13	5.01
mmu-miR-381-3p	12.56	5.01
mmu-miR-9-3p	18.84	5.01
mmu-miR-101b-3p	10.47	5.01
mmu-miR-2137	15.70	5.01
mmu-miR-504-5p	6.28	5.01
mmu-miR-700-3p	9.42	5.01
mmu-miR-17-5p	9.42	5.01
mmu-miR-676-5p	4.19	5.01
mmu-miR-140-5p	3.14	5.01
mmu-mir-6360	5.23	5.01
mmu-miR-15b-3p	5.23	5.01
mmu-miR-152-5p	5.23	5.01
mmu-miR-1839-3p	11.51	5.01
mmu-miR-369-5p	3.14	5.01
mmu-miR-34a-5p	2.09	5.01
mmu-miR-210-3p	2.09	5.01
mmu-miR-706	2.62	5.01
mmu-miR-1961	2.09	5.01
mmu-miR-1946a	2.09	5.01
mmu-miR-5106	1.05	5.01
mmu-mir-3473f	1.40	4.84
mmu-miR-184-3p	24.07	4.51
mmu-miR-3473e	12.82	4.42
mmu-miR-574-5p	38.73	4.41
mmu-miR-199b-5p	34.54	4.01
mmu-miR-370-3p	14.65	4.01
mmu-miR-375-3p	53.38	4.01
mmu-miR-425-3p	5.23	4.01
mmu-miR-96-5p	39.78	4.01
mmu-miR-26b-3p	6.28	4.01
mmu-miR-331-3p	4.19	4.01
mmu-miR-138-5p	7.33	4.01
mmu-miR-135a-5p	5.23	4.01
mmu-miR-136-5p	4.19	4.01

mmu-miR-15a-5p	0.00	4.01
mmu-miR-666-5p	12.56	4.01
mmu-miR-24-1-5p	6.28	4.01
mmu-miR-1843a-3p	3.14	4.01
mmu-miR-20a-5p	9.42	4.01
mmu-miR-501-5p	1.05	4.01
mmu-mir-1191	1.05	4.01
mmu-mir-3471-2	2.09	4.01
mmu-miR-3471	1.05	4.01
mmu-miR-5122	0.00	4.01
mmu-miR-6418-5p	1.05	4.01
mmu-miR-582-5p	1.05	4.01
mmu-miR-6965-5p	0.00	4.01
mmu-miR-450a-1-3p	0.00	4.01
mmu-miR-130b-5p	2.09	4.01
mmu-miR-181d-3p	1.05	4.01
mmu-miR-183-5p	79.55	3.00
mmu-miR-299a-3p	8.37	3.00
mmu-miR-339-5p	14.65	3.00
mmu-miR-3102-3p.2-3	4.19	3.00
mmu-miR-330-5p	6.28	3.00
mmu-miR-127-5p	6.28	3.00
mmu-miR-326-3p	5.23	3.00
mmu-miR-1955-5p	1.05	3.00
mmu-miR-193b-5p	5.23	3.00
mmu-miR-6481	2.09	3.00
mmu-miR-467d-5p	1.05	3.00
mmu-miR-1247-5p	1.05	3.00
mmu-miR-466h-3p	3.14	3.00
mmu-miR-877-5p	4.19	3.00
mmu-miR-582-3p	4.19	3.00
mmu-miR-669o-5p	3.14	3.00
mmu-miR-331-5p	2.09	3.00
mmu-miR-6239	1.05	3.00
mmu-miR-325-3p	1.05	3.00
mmu-miR-223-3p	8.37	3.00
mmu-miR-431-5p	2.09	3.00
mmu-miR-708-3p	1.05	3.00
mmu-miR-503-5p	0.00	3.00
mmu-miR-384-3p	1.05	3.00
mmu-miR-190a-5p	0.00	3.00
mmu-miR-138-2-3p	0.00	3.00
mmu-miR-6238	3.14	3.00
mmu-miR-1954	3.14	3.00
mmu-miR-92b-5p	2.09	3.00
mmu-miR-7228-5p	2.09	3.00
mmu-miR-3072-3p	2.09	3.00

mmu-miR-8115	1.05	3.00
mmu-miR-692	1.05	3.00
mmu-miR-3473g	1.05	3.00
mmu-miR-6337	0.00	3.00
mmu-miR-615-5p	0.00	3.00
mmu-miR-5098	0.00	3.00
mmu-mir-1902	0.00	3.00
mmu-miR-466m-5p	0.00	2.59
mmu-miR-145b	2.09	2.50
mmu-miR-133b-3p	2.79	2.50
mmu-miR-1187	0.00	2.34
mmu-miR-378b	0.35	2.17
mmu-miR-376b-5p	5.23	2.00
mmu-miR-496a-3p	12.56	2.00
mmu-miR-212-3p	5.23	2.00
mmu-miR-19b-3p	6.28	2.00
mmu-miR-382-3p	7.33	2.00
mmu-miR-99b-3p	4.19	2.00
mmu-miR-200b-5p	6.28	2.00
mmu-miR-324-5p	4.19	2.00
mmu-miR-466c-3p	3.14	2.00
mmu-miR-6540-5p	0.00	2.00
mmu-miR-664-5p	3.14	2.00
mmu-miR-493-5p	3.14	2.00
mmu-miR-192-3p	3.14	2.00
mmu-miR-679-5p	2.09	2.00
mmu-miR-106b-5p	1.05	2.00
mmu-miR-5112	0.00	2.00
mmu-miR-3064-5p	0.00	2.00
mmu-miR-346-5p	5.23	2.00
mmu-mir-1961	4.19	2.00
mmu-miR-6236	2.09	2.00
mmu-miR-223-5p	1.05	2.00
mmu-miR-17-3p	0.00	2.00
mmu-miR-154-5p	3.14	2.00
mmu-miR-6516-3p	1.05	2.00
mmu-miR-433-5p	1.05	2.00
mmu-miR-7068-3p	2.09	2.00
mmu-miR-344d-3p	2.09	2.00
mmu-miR-7674-5p	1.05	2.00
mmu-miR-7033-5p	1.05	2.00
mmu-miR-3102-5p	1.05	2.00
mmu-miR-7652-5p	0.00	2.00
mmu-mir-6369	0.00	2.00
mmu-miR-363-3p	0.00	2.00
mmu-miR-3074-1-3p	0.00	2.00
mmu-miR-3066-3p	0.00	2.00

mmu-miR-20a-3p	0.00	2.00
mmu-miR-1966-3p	0.00	2.00
mmu-miR-6353	3.14	2.00
mmu-miR-191-3p	3.14	2.00
mmu-miR-7058-3p	2.09	2.00
mmu-miR-677-3p	2.09	2.00
mmu-miR-873a-3p	1.05	2.00
mmu-mir-706	1.05	2.00
mmu-miR-7028-5p	1.05	2.00
mmu-miR-669h-5p	1.05	2.00
mmu-mir-6239	1.05	2.00
mmu-miR-33-3p	1.05	2.00
mmu-miR-31-5p	1.05	2.00
mmu-miR-3074-2-3p	1.05	2.00
mmu-miR-874-5p	0.00	2.00
mmu-mir-8100	0.00	2.00
mmu-mir-8098	0.00	2.00
mmu-miR-7670-3p	0.00	2.00
mmu-miR-7654-5p	0.00	2.00
mmu-miR-7116-5p	0.00	2.00
mmu-miR-7067-5p	0.00	2.00
mmu-miR-7061-5p	0.00	2.00
mmu-miR-7041-5p	0.00	2.00
mmu-miR-7031-5p	0.00	2.00
mmu-mir-703	0.00	2.00
mmu-miR-6988-3p	0.00	2.00
mmu-miR-6984-5p	0.00	2.00
mmu-mir-695	0.00	2.00
mmu-miR-6933-3p	0.00	2.00
mmu-mir-6345	0.00	2.00
mmu-miR-5124b	0.00	2.00
mmu-miR-410-5p	0.00	2.00
mmu-mir-3472	0.00	2.00
mmu-miR-291b-3p	0.00	2.00
mmu-mir-1957b	0.00	2.00
mmu-mir-1901	0.00	2.00
mmu-miR-181c-3p	0.00	2.00
mmu-miR-3473c	0.35	1.84
mmu-miR-466i-3p	1.40	1.82
mmu-miR-297a-5p	0.00	1.60
mmu-miR-3107-3p	0.00	1.50
mmu-miR-467f	0.35	1.45
mmu-miR-344-3p	0.00	1.34
mmu-miR-466f-5p	0.00	1.34
mmu-mir-1187	1.05	1.25
mmu-miR-669h-3p	1.05	1.25
mmu-miR-3473a	0.96	1.20

mmu-miR-6413	0.52	1.20
mmu-miR-466m-3p	0.00	1.17
mmu-let-7f-1-3p	6.28	1.00
mmu-miR-193b-3p	9.42	1.00
mmu-miR-299a-5p	6.28	1.00
mmu-miR-339-3p	4.19	1.00
mmu-miR-543-5p	2.09	1.00
mmu-miR-27a-5p	2.09	1.00
mmu-miR-760-3p	1.05	1.00
mmu-miR-770-3p	0.00	1.00
mmu-miR-770-5p	6.28	1.00
mmu-miR-3084-3p	2.09	1.00
mmu-miR-93-3p	0.00	1.00
mmu-miR-5121	6.28	1.00
mmu-miR-1957a	6.28	1.00
mmu-miR-350-3p	5.23	1.00
mmu-miR-466g	3.14	1.00
mmu-miR-350-5p	3.14	1.00
mmu-miR-301a-3p	2.09	1.00
mmu-miR-467e-5p	1.05	1.00
mmu-miR-673-3p	1.05	1.00
mmu-miR-194-2-3p	1.05	1.00
mmu-miR-1306-5p	1.05	1.00
mmu-miR-142-3p	4.19	1.00
mmu-miR-34c-3p	3.14	1.00
mmu-miR-1291	3.14	1.00
mmu-miR-23a-5p	2.09	1.00
mmu-miR-215-3p	2.09	1.00
mmu-miR-1934-5p	2.09	1.00
mmu-miR-669o-3p	1.05	1.00
mmu-miR-598-3p	1.05	1.00
mmu-miR-26a-2-3p	1.05	1.00
mmu-miR-7026-5p	0.00	1.00
mmu-miR-6930-5p	0.00	1.00
mmu-miR-669l-5p	0.00	1.00
mmu-miR-205-5p	15.70	1.00
mmu-miR-8114	3.14	1.00
mmu-miR-6937-5p	3.14	1.00
mmu-miR-297b-3p	3.14	1.00
mmu-miR-103-2-5p	3.14	1.00
mmu-miR-8111	2.09	1.00
mmu-mir-5124a	2.09	1.00
mmu-miR-380-3p	2.09	1.00
mmu-miR-3572-3p	2.09	1.00
mmu-miR-337-3p	2.09	1.00
mmu-mir-1983	2.09	1.00
mmu-miR-1949	2.09	1.00



mmu-miR-133a-5p	2.09	1.00
mmu-let-7c-1-3p	2.09	1.00
mmu-miR-682	1.05	1.00
mmu-mir-6379	1.05	1.00
mmu-miR-467a-3p	1.05	1.00
mmu-miR-323-5p	1.05	1.00
mmu-miR-3085-3p	1.05	1.00
mmu-mir-8112	0.52	1.00
mmu-miR-8094	0.00	1.00
mmu-miR-6946-5p	0.00	1.00
mmu-miR-5113	0.00	1.00
mmu-miR-452-5p	0.00	1.00
mmu-miR-376a-5p	0.00	1.00
mmu-miR-365-1-5p	0.00	1.00
mmu-mir-3473e	0.00	1.00
mmu-miR-3113-3p	0.00	1.00
mmu-miR-3103-5p	0.00	1.00
mmu-miR-3084-5p	0.00	1.00
mmu-miR-1964-3p	0.00	1.00
mmu-miR-1947-5p	0.00	1.00
mmu-miR-181b-1-3p	0.00	1.00
mmu-miR-1306-3p	0.00	1.00
mmu-miR-107-5p	0.00	1.00
mmu-miR-877-3p	3.14	1.00
mmu-miR-542-5p	2.09	1.00
mmu-miR-320-5p	2.09	1.00
mmu-miR-873a-5p	1.05	1.00
mmu-miR-7689-3p	1.05	1.00
mmu-miR-7668-3p	1.05	1.00
mmu-miR-7240-5p	1.05	1.00
mmu-miR-7049-5p	1.05	1.00
mmu-miR-7010-5p	1.05	1.00
mmu-mir-692-2	1.05	1.00
mmu-miR-5130	1.05	1.00
mmu-miR-5129-5p	1.05	1.00
mmu-miR-5107-5p	1.05	1.00
mmu-mir-3473d	1.05	1.00
mmu-miR-3082-3p	1.05	1.00
mmu-miR-3073a-3p	1.05	1.00
mmu-miR-3070b-5p	1.05	1.00
mmu-miR-3064-3p	1.05	1.00
mmu-miR-216c-5p	1.05	1.00
mmu-mir-1970	1.05	1.00
mmu-miR-190b-5p	1.05	1.00
mmu-miR-1895	1.05	1.00
mmu-miR-101b-5p	1.05	1.00
mmu-mir-1192	0.52	1.00

mmu-mir-8115	0.00	1.00
mmu-mir-8109	0.00	1.00
mmu-miR-8108	0.00	1.00
mmu-mir-8103	0.00	1.00
mmu-miR-8102	0.00	1.00
mmu-miR-8100	0.00	1.00
mmu-mir-8096	0.00	1.00
mmu-miR-8095	0.00	1.00
mmu-miR-7689-5p	0.00	1.00
mmu-miR-7667-5p	0.00	1.00
mmu-miR-7655-5p	0.00	1.00
mmu-miR-7653-3p	0.00	1.00
mmu-miR-7650-3p	0.00	1.00
mmu-miR-763	0.00	1.00
mmu-mir-763	0.00	1.00
mmu-miR-743b-3p	0.00	1.00
mmu-miR-7241-3p	0.00	1.00
mmu-miR-7225-5p	0.00	1.00
mmu-miR-721	0.00	1.00
mmu-miR-718	0.00	1.00
mmu-miR-7068-5p	0.00	1.00
mmu-miR-7059-3p	0.00	1.00
mmu-miR-7054-3p	0.00	1.00
mmu-miR-705	0.00	1.00
mmu-miR-7049-3p	0.00	1.00
mmu-miR-7047-5p	0.00	1.00
mmu-miR-7039-5p	0.00	1.00
mmu-miR-7034-3p	0.00	1.00
mmu-miR-7030-5p	0.00	1.00
mmu-miR-7019-5p	0.00	1.00
mmu-miR-7018-5p	0.00	1.00
mmu-miR-701-3p	0.00	1.00
mmu-miR-7010-3p	0.00	1.00
mmu-miR-7008-3p	0.00	1.00
mmu-miR-7007-5p	0.00	1.00
mmu-miR-7006-3p	0.00	1.00
mmu-miR-7003-5p	0.00	1.00
mmu-miR-7000-3p	0.00	1.00
mmu-miR-6998-3p	0.00	1.00
mmu-miR-6997-5p	0.00	1.00
mmu-miR-6990-3p	0.00	1.00
mmu-miR-6988-5p	0.00	1.00
mmu-miR-6981-5p	0.00	1.00
mmu-miR-6970-5p	0.00	1.00
mmu-miR-6957-5p	0.00	1.00
mmu-miR-6948-3p	0.00	1.00
mmu-miR-6925-5p	0.00	1.00

mmu-miR-6922-3p	0.00	1.00
mmu-mir-692-1	0.00	1.00
mmu-miR-6908-3p	0.00	1.00
mmu-miR-6898-5p	0.00	1.00
mmu-mir-688	0.00	1.00
mmu-miR-683	0.00	1.00
mmu-miR-680	0.00	1.00
mmu-miR-670-5p	0.00	1.00
mmu-mir-669j	0.00	1.00
mmu-miR-667-5p	0.00	1.00
mmu-miR-6415	0.00	1.00
mmu-mir-6373	0.00	1.00
mmu-miR-6370	0.00	1.00
mmu-miR-6364	0.00	1.00
mmu-miR-6363	0.00	1.00
mmu-mir-6361	0.00	1.00
mmu-miR-6358	0.00	1.00
mmu-miR-6342	0.00	1.00
mmu-mir-6340	0.00	1.00
mmu-miR-6241	0.00	1.00
mmu-miR-5626-5p	0.00	1.00
mmu-miR-551b-5p	0.00	1.00
mmu-mir-5126	0.00	1.00
mmu-mir-5125	0.00	1.00
mmu-mir-5122	0.00	1.00
mmu-mir-5104	0.00	1.00
mmu-mir-5103	0.00	1.00
mmu-miR-5101	0.00	1.00
mmu-miR-496b	0.00	1.00
mmu-mir-467g	0.00	1.00
mmu-miR-467e-3p	0.00	1.00
mmu-miR-466o-5p	0.00	1.00
mmu-miR-466n-3p	0.00	1.00
mmu-miR-466l-3p	0.00	1.00
mmu-mir-3970	0.00	1.00
mmu-miR-3964	0.00	1.00
mmu-mir-3473c	0.00	1.00
mmu-mir-3473a	0.00	1.00
mmu-miR-3110-5p	0.00	1.00
mmu-miR-3087-5p	0.00	1.00
mmu-miR-3076-3p	0.00	1.00
mmu-miR-3066-5p	0.00	1.00
mmu-miR-3061-5p	0.00	1.00
mmu-miR-296-5p	0.00	1.00
mmu-miR-219a-1-3p	0.00	1.00
mmu-miR-218-1-3p	0.00	1.00
mmu-miR-2136	0.00	1.00

mmu-miR-201-3p	0.00	1.00
mmu-mir-1969	0.00	1.00
mmu-miR-1962	0.00	1.00
mmu-miR-1956	0.00	1.00
mmu-mir-1953	0.00	1.00
mmu-miR-193a-3p	0.00	1.00
mmu-miR-1927	0.00	1.00
mmu-miR-1912-5p	0.00	1.00
mmu-mir-1906-2	0.00	1.00
mmu-mir-1904	0.00	1.00
mmu-miR-1894-3p	0.00	1.00
mmu-mir-1893	0.00	1.00
mmu-miR-1668	0.00	1.00
mmu-miR-146a-3p	0.00	1.00
mmu-miR-141-5p	0.00	1.00
mmu-miR-135b-3p	0.00	1.00
mmu-miR-135a-1-3p	0.00	1.00
mmu-miR-130b-3p	0.00	1.00
mmu-miR-130a-5p	0.00	1.00
mmu-miR-129b-3p	0.00	1.00
mmu-miR-1298-5p	0.00	1.00
mmu-mir-1291	0.00	1.00
mmu-miR-1198-3p	0.00	1.00
mmu-miR-1188-5p	0.00	1.00
mmu-let-7a-2-3p	0.00	1.00
mmu-miR-669b-5p	0.00	0.67
mmu-miR-344b-3p	0.00	0.67
mmu-miR-214-5p	6.28	0.50
mmu-miR-3970	0.52	0.50
mmu-miR-669d-5p	1.05	0.50
mmu-miR-6367	1.05	0.50
mmu-miR-669e-5p	0.00	0.50
mmu-mir-6342	0.00	0.50
mmu-miR-3086-3p	0.00	0.50
mmu-mir-466k	0.00	0.40
mmu-mir-3473b	0.35	0.33
mmu-miR-5128	0.79	0.25
mmu-miR-669c-3p	1.05	0.25
mmu-mir-466j	0.00	0.25
mmu-miR-3082-5p	0.00	0.20
mmu-miR-669a-3-3p	1.05	0.17
mmu-miR-455-5p	13.61	0.00
mmu-miR-491-5p	9.42	0.00
mmu-miR-467b-5p	3.14	0.00
mmu-miR-1945	4.19	0.00
mmu-miR-29b-1-5p	0.00	0.00
mmu-miR-429-3p	9.42	0.00

mmu-miR-547-3p	2.09	0.00
mmu-miR-144-5p	8.37	0.00
mmu-miR-451a	6.28	0.00
mmu-miR-376b-3p	0.00	0.00
mmu-miR-8112	3.14	0.00
mmu-miR-341-3p	2.09	0.00
mmu-miR-467c-5p	1.05	0.00
mmu-miR-362-3p	1.05	0.00
mmu-miR-141-3p	2.09	0.00
mmu-miR-505-3p	3.14	0.00
mmu-miR-187-5p	2.09	0.00
mmu-miR-8103	1.05	0.00
mmu-miR-7a-1-3p	1.05	0.00
mmu-miR-483-5p	1.05	0.00
mmu-miR-431-3p	1.05	0.00
mmu-miR-412-5p	1.05	0.00
mmu-miR-29a-5p	0.00	0.00
mmu-miR-216a-5p	6.28	0.00
mmu-miR-500-3p	5.23	0.00
mmu-miR-148a-5p	2.62	0.00
mmu-miR-744-3p	2.09	0.00
mmu-miR-6986-5p	2.09	0.00
mmu-miR-377-5p	2.09	0.00
mmu-miR-1982-3p	2.09	0.00
mmu-miR-1264-3p	2.09	0.00
mmu-miR-7688-5p	1.05	0.00
mmu-miR-6944-3p	1.05	0.00
mmu-miR-539-5p	1.05	0.00
mmu-miR-490-5p	1.05	0.00
mmu-miR-376c-3p	1.05	0.00
mmu-miR-207	1.05	0.00
mmu-miR-1901	1.05	0.00
mmu-miR-761	0.00	0.00
mmu-miR-7007-3p	0.00	0.00
mmu-miR-5114	0.00	0.00
mmu-miR-504-3p	0.00	0.00
mmu-miR-467h	0.00	0.00
mmu-miR-3475-3p	0.00	0.00
mmu-miR-301a-5p	0.00	0.00
mmu-miR-1970	0.00	0.00
mmu-miR-154-3p	0.00	0.00
mmu-miR-1249-5p	0.00	0.00
mmu-miR-1191	0.00	0.00
mmu-miR-466h-5p	0.00	0.00
mmu-miR-499-5p	5.23	0.00
mmu-miR-665-3p	4.19	0.00
mmu-miR-195a-3p	4.19	0.00

mmu-miR-222-5p	3.14	0.00
mmu-miR-137-3p	3.14	0.00
mmu-miR-758-3p	2.09	0.00
mmu-miR-7019-3p	2.09	0.00
mmu-miR-370-5p	2.09	0.00
mmu-miR-3474	2.09	0.00
mmu-miR-324-3p	2.09	0.00
mmu-miR-1968-5p	2.09	0.00
mmu-miR-128-1-5p	2.09	0.00
mmu-miR-8117	1.05	0.00
mmu-mir-8095	1.05	0.00
mmu-miR-7668-5p	1.05	0.00
mmu-miR-7042-5p	1.05	0.00
mmu-miR-6929-3p	1.05	0.00
mmu-miR-541-3p	1.05	0.00
mmu-miR-5129-3p	1.05	0.00
mmu-miR-467g	1.05	0.00
mmu-miR-206-3p	1.05	0.00
mmu-miR-16-2-3p	1.05	0.00
mmu-miR-147-5p	1.05	0.00
mmu-miR-101c	0.52	0.00
mmu-miR-92a-1-5p	0.00	0.00
mmu-miR-879-5p	0.00	0.00
mmu-mir-8119	0.00	0.00
mmu-mir-8114	0.00	0.00
mmu-mir-8106	0.00	0.00
mmu-mir-804	0.00	0.00
mmu-miR-7676-3p	0.00	0.00
mmu-miR-7671-3p	0.00	0.00
mmu-miR-7236-3p	0.00	0.00
mmu-miR-719	0.00	0.00
mmu-miR-7118-5p	0.00	0.00
mmu-miR-7116-3p	0.00	0.00
mmu-miR-7092-3p	0.00	0.00
mmu-miR-7084-5p	0.00	0.00
mmu-miR-7081-3p	0.00	0.00
mmu-miR-7073-5p	0.00	0.00
mmu-miR-7043-3p	0.00	0.00
mmu-miR-7036-3p	0.00	0.00
mmu-miR-7025-3p	0.00	0.00
mmu-miR-701-5p	0.00	0.00
mmu-miR-6968-3p	0.00	0.00
mmu-miR-6961-5p	0.00	0.00
mmu-miR-6927-3p	0.00	0.00
mmu-miR-6917-3p	0.00	0.00
mmu-miR-6903-5p	0.00	0.00
mmu-miR-6899-3p	0.00	0.00

mmu-miR-686	0.00	0.00
mmu-mir-680-2	0.00	0.00
mmu-miR-679-3p	0.00	0.00
mmu-miR-675-5p	0.00	0.00
mmu-miR-652-5p	0.00	0.00
mmu-miR-6403	0.00	0.00
mmu-mir-6353	0.00	0.00
mmu-mir-6346	0.00	0.00
mmu-miR-6339	0.00	0.00
mmu-miR-5709-5p	0.00	0.00
mmu-mir-5128	0.00	0.00
mmu-miR-495-5p	0.00	0.00
mmu-miR-493-3p	0.00	0.00
mmu-miR-488-5p	0.00	0.00
mmu-miR-3966	0.00	0.00
mmu-miR-380-5p	0.00	0.00
mmu-mir-378c	0.00	0.00
mmu-miR-3103-3p	0.00	0.00
mmu-miR-3099-3p	0.00	0.00
mmu-miR-3080-5p	0.00	0.00
mmu-miR-3078-5p	0.00	0.00
mmu-miR-3062-5p	0.00	0.00
mmu-miR-224-3p	0.00	0.00
mmu-miR-21a-3p	0.00	0.00
mmu-miR-219b-5p	0.00	0.00
mmu-miR-219a-5p	0.00	0.00
mmu-miR-211-5p	0.00	0.00
mmu-miR-210-5p	0.00	0.00
mmu-miR-20b-3p	0.00	0.00
mmu-miR-1948-5p	0.00	0.00
mmu-mir-1940	0.00	0.00
mmu-miR-1932	0.00	0.00
mmu-miR-188-5p	0.00	0.00
mmu-miR-138-1-3p	0.00	0.00
mmu-miR-135b-5p	0.00	0.00
mmu-miR-1193-5p	0.00	0.00
mmu-miR-100-3p	0.00	0.00
mmu-let-7i-3p	0.00	0.00
mmu-let-7g-3p	0.00	0.00
mmu-miR-3100-5p	4.19	0.00
mmu-miR-374c-3p	3.14	0.00
mmu-miR-153-3p	3.14	0.00
mmu-miR-1224-5p	3.14	0.00
mmu-miR-7684-5p	2.09	0.00
mmu-miR-7013-5p	2.09	0.00
mmu-miR-697	2.09	0.00
mmu-miR-6963-3p	2.09	0.00

mmu-miR-669k-3p	2.09	0.00
mmu-miR-6418-3p	2.09	0.00
mmu-mir-6237	2.09	0.00
mmu-miR-532-3p	2.09	0.00
mmu-miR-491-3p	2.09	0.00
mmu-miR-483-3p	2.09	0.00
mmu-miR-3061-3p	2.09	0.00
mmu-miR-200a-5p	2.09	0.00
mmu-miR-19a-5p	2.09	0.00
mmu-miR-19a-3p	2.09	0.00
mmu-miR-185-3p	2.09	0.00
mmu-miR-144-3p	2.09	0.00
mmu-miR-802-5p	1.05	0.00
mmu-miR-7675-5p	1.05	0.00
mmu-miR-7656-3p	1.05	0.00
mmu-miR-7217-3p	1.05	0.00
mmu-miR-7079-3p	1.05	0.00
mmu-miR-7039-3p	1.05	0.00
mmu-miR-7028-3p	1.05	0.00
mmu-miR-7021-5p	1.05	0.00
mmu-miR-7003-3p	1.05	0.00
mmu-miR-6991-5p	1.05	0.00
mmu-miR-6975-3p	1.05	0.00
mmu-miR-6952-3p	1.05	0.00
mmu-miR-6931-3p	1.05	0.00
mmu-miR-6910-3p	1.05	0.00
mmu-mir-6420	1.05	0.00
mmu-mir-6372	1.05	0.00
mmu-miR-6340	1.05	0.00
mmu-miR-544-5p	1.05	0.00
mmu-miR-5132-5p	1.05	0.00
mmu-mir-5118	1.05	0.00
mmu-miR-5110	1.05	0.00
mmu-miR-466p-5p	1.05	0.00
mmu-miR-412-3p	1.05	0.00
mmu-miR-32-5p	1.05	0.00
mmu-miR-3063-5p	1.05	0.00
mmu-miR-3060-3p	1.05	0.00
mmu-miR-211-3p	1.05	0.00
mmu-miR-200c-5p	1.05	0.00
mmu-mir-1960	1.05	0.00
mmu-miR-1948-3p	1.05	0.00
mmu-miR-1936	1.05	0.00
mmu-miR-1907	1.05	0.00
mmu-miR-1899	1.05	0.00
mmu-miR-187-3p	1.05	0.00
mmu-miR-153-5p	1.05	0.00



mmu-miR-124-5p	1.05	0.00
mmu-miR-1231-5p	1.05	0.00
mmu-miR-122-3p	1.05	0.00
mmu-miR-105	1.05	0.00
mmu-miR-21c	0.52	0.00
mmu-miR-1192	0.52	0.00
mmu-miR-6369	0.35	0.00
mmu-miR-92a-2-5p	0.00	0.00
mmu-mir-882	0.00	0.00
mmu-mir-8113	0.00	0.00
mmu-miR-8101	0.00	0.00
mmu-miR-8096	0.00	0.00
mmu-mir-8094	0.00	0.00
mmu-miR-7675-3p	0.00	0.00
mmu-miR-7673-5p	0.00	0.00
mmu-miR-7653-5p	0.00	0.00
mmu-mir-721	0.00	0.00
mmu-miR-7119-3p	0.00	0.00
mmu-mir-710	0.00	0.00
mmu-miR-7091-5p	0.00	0.00
mmu-miR-7057-3p	0.00	0.00
mmu-miR-7056-3p	0.00	0.00
mmu-miR-7044-3p	0.00	0.00
mmu-miR-7041-3p	0.00	0.00
mmu-miR-7038-5p	0.00	0.00
mmu-miR-7023-3p	0.00	0.00
mmu-miR-7015-5p	0.00	0.00
mmu-miR-7009-3p	0.00	0.00
mmu-miR-6985-5p	0.00	0.00
mmu-miR-6984-3p	0.00	0.00
mmu-miR-6964-3p	0.00	0.00
mmu-miR-6941-5p	0.00	0.00
mmu-miR-6935-3p	0.00	0.00
mmu-miR-6929-5p	0.00	0.00
mmu-miR-6922-5p	0.00	0.00
mmu-miR-6919-5p	0.00	0.00
mmu-miR-6911-3p	0.00	0.00
mmu-miR-6903-3p	0.00	0.00
mmu-miR-6899-5p	0.00	0.00
mmu-miR-678	0.00	0.00
mmu-mir-678	0.00	0.00
mmu-miR-675-3p	0.00	0.00
mmu-miR-672-3p	0.00	0.00
mmu-miR-669f-3p	0.00	0.00
mmu-miR-665-5p	0.00	0.00
mmu-miR-6539	0.00	0.00
mmu-mir-6403	0.00	0.00

mmu-miR-6398	0.00	0.00
mmu-miR-6394	0.00	0.00
mmu-mir-6394	0.00	0.00
mmu-miR-6391	0.00	0.00
mmu-miR-6383	0.00	0.00
mmu-mir-6377	0.00	0.00
mmu-miR-6376	0.00	0.00
mmu-mir-6376	0.00	0.00
mmu-miR-6355	0.00	0.00
mmu-miR-6352	0.00	0.00
mmu-mir-6241	0.00	0.00
mmu-miR-5125	0.00	0.00
mmu-miR-509-5p	0.00	0.00
mmu-miR-500-5p	0.00	0.00
mmu-miR-499-3p	0.00	0.00
mmu-mir-496b	0.00	0.00
mmu-miR-494-5p	0.00	0.00
mmu-miR-466n-5p	0.00	0.00
mmu-mir-451a	0.00	0.00
mmu-miR-449c-3p	0.00	0.00
mmu-mir-3965	0.00	0.00
mmu-mir-3962	0.00	0.00
mmu-miR-346-3p	0.00	0.00
mmu-miR-344e-3p	0.00	0.00
mmu-miR-3112-3p	0.00	0.00
mmu-miR-3067-3p	0.00	0.00
mmu-miR-3057-3p	0.00	0.00
mmu-miR-298-5p	0.00	0.00
mmu-miR-196a-2-3p	0.00	0.00
mmu-mir-1967	0.00	0.00
mmu-mir-1949	0.00	0.00
mmu-mir-1946a	0.00	0.00
mmu-miR-194-1-3p	0.00	0.00
mmu-miR-1930-5p	0.00	0.00
mmu-miR-190a-3p	0.00	0.00
mmu-miR-1902	0.00	0.00
mmu-miR-18a-3p	0.00	0.00
mmu-miR-1892	0.00	0.00
mmu-mir-145b	0.00	0.00
mmu-miR-137-5p	0.00	0.00
mmu-miR-135a-2-3p	0.00	0.00
mmu-miR-134-3p	0.00	0.00
mmu-miR-1197-5p	0.00	0.00
mmu-miR-103-1-5p	0.00	0.00

SI Table 2. miRNA expression levels in colon

miR_name	norm_ob-plus_Colon	norm_ob-ob_Colon
mmu-miR-145a-5p	43,758.55	62,234.60
mmu-miR-143-3p	45,708.96	46,102.71
mmu-miR-10a-5p	43,746.33	39,621.10
mmu-miR-125b-5p	45,629.00	30,522.49
mmu-let-7f-5p	14,934.82	21,066.28
mmu-let-7c-5p	28,003.78	23,597.42
mmu-let-7a-5p	14,821.79	20,000.22
mmu-miR-26a-5p	27,708.21	18,412.76
mmu-miR-125a-5p	21,117.85	18,788.76
mmu-miR-30c-5p	5,906.41	7,545.08
mmu-let-7g-5p	4,231.34	6,910.84
mmu-miR-10b-5p	74,958.21	4,134.28
mmu-let-7d-5p	4,681.36	5,855.03
mmu-miR-27b-3p	4,798.22	5,779.15
mmu-let-7b-5p	7,551.13	6,452.42
mmu-miR-191-5p	5,652.00	4,313.34
mmu-miR-145a-3p	2,754.30	4,187.20
mmu-miR-100-5p	3,599.49	3,156.35
mmu-miR-99b-5p	4,988.53	2,841.73
mmu-miR-23a-3p	6,343.55	2,873.63
mmu-let-7i-5p	3,520.19	4,060.34
mmu-miR-23b-3p	3,108.83	2,312.53
mmu-miR-24-3p	3,262.47	2,512.61
mmu-miR-99a-5p	5,998.27	2,089.25
mmu-miR-181a-5p	3,408.18	2,099.40
mmu-miR-541-5p	2,205.16	1,633.99
mmu-miR-30e-5p	807.19	1,575.27
mmu-miR-30d-5p	2,048.21	1,709.39
mmu-let-7e-5p	816.44	1,536.37
mmu-miR-143-5p	777.13	925.01
mmu-miR-378a-3p	1,134.90	1,091.75
mmu-miR-30a-5p	776.46	1,102.62
mmu-miR-26b-5p	1,354.02	1,151.67
mmu-miR-351-5p	291.42	1,048.25
mmu-mir-6240	205.52	827.87
mmu-miR-146a-5p	463.57	757.55
mmu-miR-22-3p	1,071.85	867.02
mmu-miR-127-3p	2,082.91	1,038.10
mmu-miR-486-5p	611.26	806.12
mmu-miR-365-3p	398.47	471.21
mmu-miR-30b-5p	941.67	790.17
mmu-miR-5099	288.12	824.97
mmu-miR-455-3p	1,506.01	533.55
mmu-mir-6236	697.83	745.23
mmu-miR-423-5p	503.55	642.29

mmu-miR-181b-5p	818.10	787.28
mmu-miR-16-5p	664.79	571.25
mmu-miR-342-3p	248.47	392.91
mmu-miR-7a-5p	240.87	463.96
mmu-miR-335-5p	828.67	382.76
mmu-miR-29a-3p	841.22	459.61
mmu-miR-7b-5p	197.92	429.16
mmu-miR-30a-3p	235.91	376.96
mmu-let-7j	410.70	463.96
mmu-miR-92a-3p	444.73	387.11
mmu-miR-3470b	69.39	425.53
mmu-miR-151-5p	496.94	293.60
mmu-miR-103-3p	412.13	354.25
mmu-miR-98-5p	208.95	325.54
mmu-miR-361-5p	329.75	275.47
mmu-miR-21a-5p	448.70	318.97
mmu-miR-320-3p	385.92	339.27
mmu-miR-322-3p	129.52	279.82
mmu-miR-148a-3p	377.99	233.43
mmu-miR-224-5p	273.58	294.32
mmu-miR-133a-3p	122.25	180.75
mmu-miR-30e-3p	113.00	240.68
mmu-let-7d-3p	392.53	260.98
mmu-miR-199b-3p	1,017.00	188.48
mmu-miR-3535	206.18	130.49
mmu-miR-186-5p	222.70	220.38
mmu-miR-652-3p	286.80	198.63
mmu-miR-328-3p	266.31	229.08
mmu-miR-152-3p	246.49	147.89
mmu-miR-148b-3p	87.23	130.49
mmu-miR-139-5p	208.82	178.33
mmu-miR-199a-5p	996.52	192.83
mmu-miR-708-5p	76.66	162.38
mmu-miR-690	61.24	153.01
mmu-miR-503-3p	31.06	191.38
mmu-mir-1954	26.10	170.36
mmu-miR-362-5p	216.09	114.54
mmu-mir-3535	78.64	221.83
mmu-miR-126a-3p	160.58	192.83
mmu-miR-744-5p	152.65	140.64
mmu-miR-221-3p	446.71	169.63
mmu-miR-1839-5p	81.94	72.49
mmu-miR-181d-5p	84.92	208.78
mmu-miR-434-3p	239.88	115.99
mmu-miR-151-3p	290.76	121.79
mmu-miR-6240	72.03	123.24
mmu-miR-15b-5p	96.48	110.19

mmu-miR-92b-3p	79.96	113.09
mmu-miR-27a-3p	176.44	111.64
mmu-miR-185-5p	66.08	88.44
mmu-miR-501-3p	171.15	111.64
mmu-miR-664-3p	106.39	120.34
mmu-miR-140-3p	194.94	72.49
mmu-miR-378c	121.54	94.24
mmu-miR-25-3p	173.80	118.89
mmu-miR-3968	63.44	74.67
mmu-miR-28a-3p	116.30	98.59
mmu-miR-450a-5p	35.02	98.59
mmu-miR-382-5p	131.50	120.34
mmu-miR-409-5p	170.49	114.54
mmu-miR-129-2-3p	81.94	150.79
mmu-miR-484	144.06	130.49
mmu-miR-490-3p	27.75	57.99
mmu-miR-146b-5p	84.25	57.27
mmu-mir-3470b	13.22	97.14
mmu-miR-149-5p	151.99	126.14
mmu-miR-125b-1-3p	108.37	76.84
mmu-let-7a-1-3p	99.78	94.24
mmu-let-7b-3p	107.05	92.79
mmu-miR-28c	50.22	64.52
mmu-miR-351-3p	11.23	91.34
mmu-miR-3963	9.91	89.17
mmu-miR-3470a	9.91	63.79
mmu-miR-1983	14.54	47.85
mmu-miR-221-5p	132.82	39.15
mmu-miR-330-3p	54.19	78.29
mmu-miR-222-3p	317.85	79.74
mmu-miR-423-3p	86.57	73.94
mmu-miR-195a-5p	149.35	62.34
mmu-miR-335-3p	147.36	63.79
mmu-miR-9-5p	47.58	85.54
mmu-mir-5098	10.90	60.17
mmu-miR-128-3p	70.71	53.64
mmu-miR-10a-3p	58.15	59.44
mmu-miR-615-3p	9.91	40.60
mmu-miR-125a-3p	48.90	63.79
mmu-miR-342-5p	16.52	43.50
mmu-miR-676-3p	89.87	50.75
mmu-miR-434-5p	126.88	72.49
mmu-miR-194-5p	55.51	37.70
mmu-miR-378d	42.46	40.60
mmu-miR-338-5p	40.31	43.50
mmu-miR-215-5p	31.72	30.45
mmu-miR-760-5p	7.27	40.60

mmu-miR-130a-3p	90.53	49.30
mmu-miR-5100	8.59	34.80
mmu-miR-374b-5p	77.98	52.20
mmu-miR-129-5p	49.56	82.64
mmu-miR-126a-5p	43.61	47.85
mmu-miR-542-3p	5.29	34.80
mmu-miR-379-5p	109.04	31.90
mmu-miR-1198-5p	38.99	43.50
mmu-miR-204-5p	97.14	46.40
mmu-miR-24-2-5p	50.22	34.80
mmu-miR-3068-5p	26.43	44.95
mmu-miR-1194	7.93	42.05
mmu-miR-132-3p	72.03	27.55
mmu-miR-1843b-5p	31.06	30.45
mmu-mir-3470a	3.96	40.60
mmu-miR-129-1-3p	9.25	34.80
mmu-miR-3472	7.27	37.70
mmu-miR-29b-3p	28.86	31.41
mmu-miR-872-5p	18.50	34.80
mmu-miR-218-5p	10.57	31.90
mmu-miR-34c-5p	81.28	50.75
mmu-miR-101a-3p	62.78	18.12
mmu-miR-107-3p	24.67	19.81
mmu-miR-30c-2-3p	25.77	29.00
mmu-miR-409-3p	59.47	36.25
mmu-miR-485-5p	37.01	29.00
mmu-miR-30b-3p	21.15	21.75
mmu-miR-433-3p	79.30	52.20
mmu-miR-212-5p	49.56	15.95
mmu-miR-329-3p	52.87	21.75
mmu-miR-425-5p	49.56	26.10
mmu-miR-192-5p	111.68	29.00
mmu-miR-543-3p	46.26	24.65
mmu-miR-139-3p	30.40	24.65
mmu-miR-340-3p	11.23	29.00
mmu-miR-1981-5p	24.45	33.35
mmu-miR-329-5p	46.26	26.10
mmu-miR-3068-3p	17.18	21.75
mmu-miR-93-5p	9.25	21.75
mmu-miR-674-3p	25.77	17.40
mmu-miR-23b-5p	15.20	14.50
mmu-miR-1249-3p	17.18	29.00
mmu-miR-142-5p	11.23	24.65
mmu-miR-574-3p	190.32	33.35
mmu-miR-669c-5p	16.52	21.75
mmu-miR-7035-5p	3.96	30.45
mmu-miR-181a-2-3p	15.86	27.55

mmu-miR-1a-3p	5.95	13.05
mmu-miR-340-5p	4.63	13.05
mmu-miR-203-3p	70.71	13.05
mmu-miR-181a-1-3p	23.79	13.05
mmu-miR-1195	3.30	18.85
mmu-miR-674-5p	15.20	11.60
mmu-miR-709	3.30	20.30
mmu-miR-124-3p	23.79	17.40
mmu-miR-30c-1-3p	12.56	11.60
mmu-miR-703	0.01	5.80
mmu-miR-3473f	4.08	22.52
mmu-miR-872-3p	19.16	20.30
mmu-miR-1193-3p	17.84	10.15
mmu-miR-377-3p	9.91	11.60
mmu-miR-6538	7.27	7.25
mmu-miR-322-5p	3.30	26.10
mmu-mir-1194	1.32	10.15
mmu-mir-8111	1.98	8.70
mmu-miR-196a-5p	275.01	39.15
mmu-miR-10b-3p	145.38	15.95
mmu-miR-874-3p	17.84	10.15
mmu-miR-29c-3p	13.44	30.93
mmu-miR-181c-5p	9.25	14.50
mmu-miR-345-3p	20.49	14.50
mmu-miR-494-3p	18.50	4.35
mmu-miR-214-3p	122.25	15.95
mmu-miR-411-3p	57.16	12.32
mmu-miR-132-5p	11.23	4.35
mmu-miR-338-3p	10.57	24.65
mmu-miR-671-5p	10.57	7.25
mmu-miR-1843b-3p	7.93	2.90
mmu-miR-486-3p	4.30	4.35
mmu-miR-485-3p	37.01	18.85
mmu-miR-134-5p	25.11	14.50
mmu-miR-497-5p	17.18	10.15
mmu-miR-27b-5p	13.88	18.85
mmu-miR-361-3p	13.22	8.70
mmu-miR-410-3p	11.23	7.25
mmu-miR-29c-5p	9.25	14.50
mmu-miR-3057-5p	4.63	5.80
mmu-miR-450b-5p	1.98	10.15
mmu-miR-122-5p	82.60	13.05
mmu-miR-136-3p	37.67	20.30
mmu-miR-125b-2-3p	20.49	13.05
mmu-miR-323-3p	19.82	13.05
mmu-miR-155-5p	18.50	10.15
mmu-miR-378a-5p	12.56	8.70

mmu-miR-365-2-5p	3.96	11.60
mmu-miR-200b-3p	118.62	17.40
mmu-miR-200c-3p	39.32	11.60
mmu-miR-182-5p	31.06	0.00
mmu-miR-379-3p	23.46	6.52
mmu-miR-667-3p	17.84	23.20
mmu-miR-6516-5p	5.29	4.35
mmu-mir-1946b	4.63	15.95
mmu-miR-488-3p	3.96	4.35
mmu-miR-450b-3p	1.98	10.15
mmu-miR-467c-3p	0.66	5.80
mmu-mir-1195	0.33	11.60
mmu-miR-150-5p	14.54	21.75
mmu-miR-384-5p	11.89	14.50
mmu-miR-1943-5p	9.25	8.70
mmu-miR-505-5p	7.93	14.50
mmu-miR-29b-2-5p	1.98	14.50
mmu-miR-30d-3p	1.32	0.00
mmu-miR-677-5p	1.32	4.35
mmu-miR-669a-5p	13.22	21.75
mmu-miR-3473b	7.16	9.11
mmu-miR-540-3p	24.45	2.90
mmu-miR-411-5p	17.18	13.05
mmu-miR-1981-3p	17.18	17.40
mmu-miR-671-3p	14.54	5.80
mmu-miR-383-5p	14.54	10.15
mmu-miR-495-3p	13.22	2.90
mmu-miR-700-5p	10.57	14.50
mmu-miR-421-3p	10.57	8.70
mmu-miR-345-5p	9.91	4.35
mmu-miR-193a-5p	5.95	7.25
mmu-miR-148b-5p	3.96	4.35
mmu-miR-1940	3.30	2.90
mmu-miR-22-5p	2.64	2.90
mmu-let-7f-2-3p	1.98	2.90
mmu-miR-592-5p	0.66	8.70
mmu-miR-5119	0.66	0.00
mmu-miR-466i-5p	0.99	7.81
mmu-miR-6407	0.00	5.07
mmu-miR-1934-3p	2.20	8.82
mmu-miR-532-5p	27.75	8.70
mmu-let-7e-3p	22.47	17.40
mmu-miR-337-5p	17.18	11.60
mmu-miR-668-3p	10.57	7.25
mmu-miR-300-3p	6.61	2.90
mmu-miR-34b-3p	6.61	2.90
mmu-miR-106b-3p	6.61	7.25



mmu-miR-673-5p	5.29	4.35
mmu-miR-487b-3p	5.29	5.80
mmu-miR-5126	4.63	5.80
mmu-miR-672-5p	2.64	5.80
mmu-miR-6412	2.64	11.60
mmu-miR-369-3p	2.64	1.45
mmu-miR-25-5p	2.64	10.15
mmu-miR-546	1.98	2.90
mmu-mir-682	1.98	10.15
mmu-miR-98-3p	1.98	2.90
mmu-miR-466f-3p	1.32	4.35
mmu-miR-196b-5p	1,207.21	14.50
mmu-miR-200a-3p	26.65	4.35
mmu-miR-381-3p	14.54	13.05
mmu-miR-9-3p	10.57	2.90
mmu-miR-101b-3p	10.57	3.62
mmu-miR-2137	9.91	7.25
mmu-miR-504-5p	6.61	5.80
mmu-miR-700-3p	5.95	14.50
mmu-miR-17-5p	5.29	2.90
mmu-miR-676-5p	4.63	1.45
mmu-miR-140-5p	4.63	7.25
mmu-mir-6360	3.96	10.15
mmu-miR-15b-3p	3.96	0.00
mmu-miR-152-5p	3.96	2.90
mmu-miR-1839-3p	3.30	8.70
mmu-miR-369-5p	3.30	8.70
mmu-miR-34a-5p	3.30	8.70
mmu-miR-210-3p	2.64	5.80
mmu-miR-706	0.33	3.62
mmu-miR-1961	0.00	4.35
mmu-miR-1946a	0.00	2.90
mmu-miR-5106	0.00	0.00
mmu-mir-3473f	0.44	5.07
mmu-miR-184-3p	17.84	2.90
mmu-miR-3473e	7.16	8.10
mmu-miR-574-5p	38.99	0.16
mmu-miR-199b-5p	38.99	11.60
mmu-miR-370-3p	17.18	11.60
mmu-miR-375-3p	13.22	4.35
mmu-miR-425-3p	11.23	8.70
mmu-miR-96-5p	7.93	0.00
mmu-miR-26b-3p	7.27	2.90
mmu-miR-331-3p	6.61	2.90
mmu-miR-138-5p	5.29	1.45
mmu-miR-135a-5p	4.63	1.45
mmu-miR-136-5p	4.63	10.15

mmu-miR-15a-5p	4.63	5.80
mmu-miR-666-5p	3.96	1.45
mmu-miR-24-1-5p	3.30	1.45
mmu-miR-1843a-3p	2.64	0.00
mmu-miR-20a-5p	1.98	7.25
mmu-miR-501-5p	1.98	2.90
mmu-mir-1191	1.98	2.90
mmu-mir-3471-2	1.32	4.35
mmu-miR-3471	1.32	2.90
mmu-miR-5122	1.32	4.35
mmu-miR-6418-5p	0.66	4.35
mmu-miR-582-5p	0.66	4.35
mmu-miR-6965-5p	0.66	1.45
mmu-miR-450a-1-3p	0.66	7.25
mmu-miR-130b-5p	0.00	4.35
mmu-miR-181d-3p	0.00	0.00
mmu-miR-183-5p	15.86	2.90
mmu-miR-299a-3p	13.22	2.90
mmu-miR-339-5p	7.93	2.90
mmu-miR-3102-3p.2-3	7.93	1.45
mmu-miR-330-5p	6.61	2.90
mmu-miR-127-5p	6.61	0.00
mmu-miR-326-3p	5.95	5.80
mmu-miR-1955-5p	3.96	0.00
mmu-miR-193b-5p	3.30	5.80
mmu-miR-6481	2.64	4.35
mmu-miR-467d-5p	2.64	1.45
mmu-miR-1247-5p	2.64	5.80
mmu-miR-466h-3p	2.15	0.36
mmu-miR-877-5p	1.98	8.70
mmu-miR-582-3p	1.98	0.00
mmu-miR-669o-5p	1.98	1.45
mmu-miR-331-5p	1.98	0.00
mmu-miR-6239	1.98	0.00
mmu-miR-325-3p	1.98	0.00
mmu-miR-223-3p	1.32	5.80
mmu-miR-431-5p	1.32	4.35
mmu-miR-708-3p	1.32	13.05
mmu-miR-503-5p	1.32	1.45
mmu-miR-384-3p	0.66	2.90
mmu-miR-190a-5p	0.66	2.90
mmu-miR-138-2-3p	0.66	0.00
mmu-miR-6238	0.00	2.90
mmu-miR-1954	0.00	2.90
mmu-miR-92b-5p	0.00	2.90
mmu-miR-7228-5p	0.00	0.00
mmu-miR-3072-3p	0.00	0.00

mmu-miR-8115	0.00	5.80
mmu-miR-692	0.00	0.00
mmu-miR-3473g	0.00	0.00
mmu-miR-6337	0.00	0.00
mmu-miR-615-5p	0.00	1.45
mmu-miR-5098	0.00	4.35
mmu-mir-1902	0.00	0.00
mmu-miR-466m-5p	1.32	1.45
mmu-miR-145b	1.65	0.72
mmu-miR-133b-3p	1.32	1.93
mmu-miR-1187	0.17	1.61
mmu-miR-378b	1.60	0.00
mmu-miR-376b-5p	11.89	4.35
mmu-miR-496a-3p	7.93	5.80
mmu-miR-212-3p	6.61	0.00
mmu-miR-19b-3p	5.95	5.80
mmu-miR-382-3p	5.29	2.90
mmu-miR-99b-3p	5.29	1.45
mmu-miR-200b-5p	3.96	0.00
mmu-miR-324-5p	3.96	1.45
mmu-miR-466c-3p	3.96	6.89
mmu-miR-6540-5p	3.96	1.45
mmu-miR-664-5p	3.30	1.45
mmu-miR-493-5p	3.30	4.35
mmu-miR-192-3p	3.30	2.90
mmu-miR-679-5p	2.64	1.45
mmu-miR-106b-5p	2.64	0.00
mmu-miR-5112	2.64	0.00
mmu-miR-3064-5p	2.64	1.45
mmu-miR-346-5p	1.98	0.00
mmu-mir-1961	1.98	2.90
mmu-miR-6236	1.98	4.35
mmu-miR-223-5p	1.98	2.90
mmu-miR-17-3p	1.98	0.00
mmu-miR-154-5p	1.32	1.45
mmu-miR-6516-3p	1.32	1.45
mmu-miR-433-5p	1.32	0.00
mmu-miR-7068-3p	0.66	1.45
mmu-miR-344d-3p	0.66	0.00
mmu-miR-7674-5p	0.66	1.45
mmu-miR-7033-5p	0.66	0.00
mmu-miR-3102-5p	0.66	0.00
mmu-miR-7652-5p	0.66	0.00
mmu-mir-6369	0.66	1.45
mmu-miR-363-3p	0.66	1.45
mmu-miR-3074-1-3p	0.66	1.45
mmu-miR-3066-3p	0.66	0.00

mmu-miR-20a-3p	0.66	2.90
mmu-miR-1966-3p	0.66	0.00
mmu-miR-6353	0.00	0.00
mmu-miR-191-3p	0.00	0.00
mmu-miR-7058-3p	0.00	0.00
mmu-miR-677-3p	0.00	8.70
mmu-miR-873a-3p	0.00	2.90
mmu-mir-706	0.00	0.72
mmu-miR-7028-5p	0.00	0.00
mmu-miR-669h-5p	0.00	0.00
mmu-mir-6239	0.00	2.90
mmu-miR-33-3p	0.00	0.00
mmu-miR-31-5p	0.00	4.35
mmu-miR-3074-2-3p	0.00	1.45
mmu-miR-874-5p	0.00	1.45
mmu-mir-8100	0.00	1.45
mmu-mir-8098	0.00	0.00
mmu-miR-7670-3p	0.00	1.45
mmu-miR-7654-5p	0.00	0.00
mmu-miR-7116-5p	0.00	0.00
mmu-miR-7067-5p	0.00	0.00
mmu-miR-7061-5p	0.00	0.00
mmu-miR-7041-5p	0.00	2.90
mmu-miR-7031-5p	0.00	0.00
mmu-mir-703	0.00	1.45
mmu-miR-6988-3p	0.00	0.00
mmu-miR-6984-5p	0.00	0.00
mmu-mir-695	0.00	0.00
mmu-miR-6933-3p	0.00	0.00
mmu-mir-6345	0.00	1.45
mmu-miR-5124b	0.00	0.00
mmu-miR-410-5p	0.00	0.00
mmu-mir-3472	0.00	0.00
mmu-miR-291b-3p	0.00	0.00
mmu-mir-1957b	0.00	0.00
mmu-mir-1901	0.00	0.00
mmu-miR-181c-3p	0.00	2.90
mmu-miR-3473c	0.44	3.62
mmu-miR-466i-3p	0.17	1.01
mmu-miR-297a-5p	1.32	1.45
mmu-miR-3107-3p	0.33	1.45
mmu-miR-467f	0.66	0.52
mmu-miR-344-3p	0.66	0.00
mmu-miR-466f-5p	0.00	0.00
mmu-mir-1187	0.66	0.00
mmu-miR-669h-3p	0.17	0.00
mmu-miR-3473a	0.44	2.22

mmu-miR-6413	0.00	1.74
mmu-miR-466m-3p	0.00	0.00
mmu-let-7f-1-3p	14.54	11.60
mmu-miR-193b-3p	7.93	2.90
mmu-miR-299a-5p	6.61	0.00
mmu-miR-339-3p	5.29	0.00
mmu-miR-543-5p	5.29	0.00
mmu-miR-27a-5p	5.29	2.90
mmu-miR-760-3p	4.63	0.00
mmu-miR-770-3p	4.63	1.45
mmu-miR-770-5p	3.96	4.35
mmu-miR-3084-3p	3.96	4.35
mmu-miR-93-3p	3.96	1.45
mmu-miR-5121	3.30	2.90
mmu-miR-1957a	2.64	2.90
mmu-miR-350-3p	2.64	0.00
mmu-miR-466g	2.64	2.90
mmu-miR-350-5p	2.64	4.35
mmu-miR-301a-3p	2.64	4.35
mmu-miR-467e-5p	2.64	2.90
mmu-miR-673-3p	1.98	0.00
mmu-miR-194-2-3p	1.98	0.00
mmu-miR-1306-5p	1.98	4.35
mmu-miR-142-3p	1.32	0.00
mmu-miR-34c-3p	1.32	1.45
mmu-miR-1291	1.32	0.00
mmu-miR-23a-5p	1.32	0.00
mmu-miR-215-3p	1.32	0.00
mmu-miR-1934-5p	1.32	0.00
mmu-miR-669o-3p	1.32	1.45
mmu-miR-598-3p	1.32	1.45
mmu-miR-26a-2-3p	1.32	2.90
mmu-miR-7026-5p	1.32	0.00
mmu-miR-6930-5p	1.32	0.00
mmu-miR-669l-5p	1.32	4.35
mmu-miR-205-5p	0.66	2.90
mmu-miR-8114	0.66	0.00
mmu-miR-6937-5p	0.66	0.00
mmu-miR-297b-3p	0.66	0.00
mmu-miR-103-2-5p	0.66	0.00
mmu-miR-8111	0.66	0.00
mmu-mir-5124a	0.66	2.90
mmu-miR-380-3p	0.66	2.90
mmu-miR-3572-3p	0.66	1.45
mmu-miR-337-3p	0.66	0.00
mmu-mir-1983	0.66	4.35
mmu-miR-1949	0.66	0.00

mmu-miR-133a-5p	0.66	4.35
mmu-let-7c-1-3p	0.66	2.90
mmu-miR-682	0.66	0.00
mmu-mir-6379	0.66	0.00
mmu-miR-467a-3p	0.66	0.00
mmu-miR-323-5p	0.66	1.45
mmu-miR-3085-3p	0.66	0.00
mmu-mir-8112	0.66	0.00
mmu-miR-8094	0.66	1.45
mmu-miR-6946-5p	0.66	0.00
mmu-miR-5113	0.66	0.00
mmu-miR-452-5p	0.66	1.45
mmu-miR-376a-5p	0.66	1.45
mmu-miR-365-1-5p	0.66	0.00
mmu-mir-3473e	0.66	0.00
mmu-miR-3113-3p	0.66	2.90
mmu-miR-3103-5p	0.66	0.00
mmu-miR-3084-5p	0.66	1.45
mmu-miR-1964-3p	0.66	0.00
mmu-miR-1947-5p	0.66	0.00
mmu-miR-181b-1-3p	0.66	1.45
mmu-miR-1306-3p	0.66	0.00
mmu-miR-107-5p	0.66	0.00
mmu-miR-877-3p	0.00	5.80
mmu-miR-542-5p	0.00	0.00
mmu-miR-320-5p	0.00	0.00
mmu-miR-873a-5p	0.00	1.45
mmu-miR-7689-3p	0.00	0.00
mmu-miR-7668-3p	0.00	1.45
mmu-miR-7240-5p	0.00	0.00
mmu-miR-7049-5p	0.00	0.00
mmu-miR-7010-5p	0.00	0.00
mmu-mir-692-2	0.00	0.00
mmu-miR-5130	0.00	1.45
mmu-miR-5129-5p	0.00	1.45
mmu-miR-5107-5p	0.00	0.00
mmu-mir-3473d	0.00	2.90
mmu-miR-3082-3p	0.00	0.00
mmu-miR-3073a-3p	0.00	0.00
mmu-miR-3070b-5p	0.00	2.90
mmu-miR-3064-3p	0.00	0.00
mmu-miR-216c-5p	0.00	0.00
mmu-mir-1970	0.00	0.00
mmu-miR-190b-5p	0.00	0.00
mmu-miR-1895	0.00	1.45
mmu-miR-101b-5p	0.00	0.00
mmu-mir-1192	0.00	0.72

mmu-mir-8115	0.00	1.45
mmu-mir-8109	0.00	0.00
mmu-miR-8108	0.00	2.90
mmu-mir-8103	0.00	0.00
mmu-miR-8102	0.00	0.00
mmu-miR-8100	0.00	0.00
mmu-mir-8096	0.00	1.45
mmu-miR-8095	0.00	0.00
mmu-miR-7689-5p	0.00	0.00
mmu-miR-7667-5p	0.00	1.45
mmu-miR-7655-5p	0.00	0.00
mmu-miR-7653-3p	0.00	0.00
mmu-miR-7650-3p	0.00	0.00
mmu-miR-763	0.00	4.35
mmu-mir-763	0.00	0.00
mmu-miR-743b-3p	0.00	0.00
mmu-miR-7241-3p	0.00	0.00
mmu-miR-7225-5p	0.00	0.00
mmu-miR-721	0.00	0.00
mmu-miR-718	0.00	0.00
mmu-miR-7068-5p	0.00	0.00
mmu-miR-7059-3p	0.00	0.00
mmu-miR-7054-3p	0.00	0.00
mmu-miR-705	0.00	0.00
mmu-miR-7049-3p	0.00	0.00
mmu-miR-7047-5p	0.00	0.00
mmu-miR-7039-5p	0.00	0.00
mmu-miR-7034-3p	0.00	0.00
mmu-miR-7030-5p	0.00	0.00
mmu-miR-7019-5p	0.00	0.00
mmu-miR-7018-5p	0.00	0.00
mmu-miR-701-3p	0.00	0.00
mmu-miR-7010-3p	0.00	0.00
mmu-miR-7008-3p	0.00	0.00
mmu-miR-7007-5p	0.00	0.00
mmu-miR-7006-3p	0.00	0.00
mmu-miR-7003-5p	0.00	0.00
mmu-miR-7000-3p	0.00	0.00
mmu-miR-6998-3p	0.00	0.00
mmu-miR-6997-5p	0.00	1.45
mmu-miR-6990-3p	0.00	0.00
mmu-miR-6988-5p	0.00	0.00
mmu-miR-6981-5p	0.00	0.00
mmu-miR-6970-5p	0.00	0.00
mmu-miR-6957-5p	0.00	0.00
mmu-miR-6948-3p	0.00	0.00
mmu-miR-6925-5p	0.00	0.00

mmu-miR-6922-3p	0.00	0.00
mmu-mir-692-1	0.00	0.00
mmu-miR-6908-3p	0.00	0.00
mmu-miR-6898-5p	0.00	0.00
mmu-mir-688	0.00	0.00
mmu-miR-683	0.00	0.00
mmu-miR-680	0.00	0.00
mmu-miR-670-5p	0.00	0.00
mmu-mir-669j	0.00	0.00
mmu-miR-667-5p	0.00	1.45
mmu-miR-6415	0.00	0.00
mmu-mir-6373	0.00	0.00
mmu-miR-6370	0.00	0.00
mmu-miR-6364	0.00	0.00
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mmu-mir-6361	0.00	0.00
mmu-miR-6358	0.00	0.00
mmu-miR-6342	0.00	0.00
mmu-mir-6340	0.00	0.00
mmu-miR-6241	0.00	1.45
mmu-miR-5626-5p	0.00	0.00
mmu-miR-551b-5p	0.00	0.00
mmu-mir-5126	0.00	0.00
mmu-mir-5125	0.00	1.45
mmu-mir-5122	0.00	0.00
mmu-mir-5104	0.00	0.00
mmu-mir-5103	0.00	0.00
mmu-miR-5101	0.00	0.00
mmu-miR-496b	0.00	0.00
mmu-mir-467g	0.00	0.00
mmu-miR-467e-3p	0.00	0.00
mmu-miR-466o-5p	0.00	1.45
mmu-miR-466n-3p	0.00	1.45
mmu-miR-466l-3p	0.00	0.00
mmu-mir-3970	0.00	0.00
mmu-miR-3964	0.00	0.00
mmu-mir-3473c	0.00	0.00
mmu-mir-3473a	0.00	1.45
mmu-miR-3110-5p	0.00	0.00
mmu-miR-3087-5p	0.00	0.00
mmu-miR-3076-3p	0.00	0.00
mmu-miR-3066-5p	0.00	1.45
mmu-miR-3061-5p	0.00	0.00
mmu-miR-296-5p	0.00	1.45
mmu-miR-219a-1-3p	0.00	0.00
mmu-miR-218-1-3p	0.00	0.00
mmu-miR-2136	0.00	0.00



mmu-miR-201-3p	0.00	0.00
mmu-mir-1969	0.00	0.00
mmu-miR-1962	0.00	0.00
mmu-miR-1956	0.00	0.00
mmu-mir-1953	0.00	0.00
mmu-miR-193a-3p	0.00	0.00
mmu-miR-1927	0.00	0.00
mmu-miR-1912-5p	0.00	0.00
mmu-mir-1906-2	0.00	1.45
mmu-mir-1904	0.00	0.00
mmu-miR-1894-3p	0.00	0.00
mmu-mir-1893	0.00	0.00
mmu-miR-1668	0.00	0.00
mmu-miR-146a-3p	0.00	0.00
mmu-miR-141-5p	0.00	0.00
mmu-miR-135b-3p	0.00	0.00
mmu-miR-135a-1-3p	0.00	2.90
mmu-miR-130b-3p	0.00	1.45
mmu-miR-130a-5p	0.00	0.00
mmu-miR-129b-3p	0.00	0.00
mmu-miR-1298-5p	0.00	0.00
mmu-mir-1291	0.00	1.45
mmu-miR-1198-3p	0.00	1.45
mmu-miR-1188-5p	0.00	1.45
mmu-let-7a-2-3p	0.00	2.90
mmu-miR-669b-5p	0.22	0.00
mmu-miR-344b-3p	0.00	0.00
mmu-miR-214-5p	2.64	0.00
mmu-miR-3970	0.33	0.00
mmu-miR-669d-5p	0.00	0.00
mmu-miR-6367	0.00	0.00
mmu-miR-669e-5p	0.00	0.00
mmu-mir-6342	0.00	0.00
mmu-miR-3086-3p	0.00	0.00
mmu-mir-466k	0.00	0.00
mmu-mir-3473b	0.44	0.00
mmu-miR-5128	0.33	1.81
mmu-miR-669c-3p	0.17	1.45
mmu-mir-466j	0.17	0.00
mmu-miR-3082-5p	0.00	0.16
mmu-miR-669a-3-3p	0.00	0.00
mmu-miR-455-5p	9.91	4.35
mmu-miR-491-5p	9.91	4.35
mmu-miR-467b-5p	7.93	6.96
mmu-miR-1945	5.29	0.00
mmu-miR-29b-1-5p	5.29	1.45
mmu-miR-429-3p	4.85	0.00

mmu-miR-547-3p	4.63	0.00
mmu-miR-144-5p	3.96	0.00
mmu-miR-451a	3.96	0.00
mmu-miR-376b-3p	3.96	1.45
mmu-miR-8112	3.30	2.90
mmu-miR-341-3p	3.30	0.00
mmu-miR-467c-5p	3.30	1.74
mmu-miR-362-3p	2.64	1.45
mmu-miR-141-3p	2.20	0.00
mmu-miR-505-3p	1.98	1.45
mmu-miR-187-5p	1.98	1.45
mmu-miR-8103	1.98	0.00
mmu-miR-7a-1-3p	1.98	0.00
mmu-miR-483-5p	1.98	4.35
mmu-miR-431-3p	1.98	1.45
mmu-miR-412-5p	1.98	0.00
mmu-miR-29a-5p	1.98	2.90
mmu-miR-216a-5p	1.32	0.00
mmu-miR-500-3p	1.32	0.00
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mmu-miR-744-3p	1.32	0.00
mmu-miR-6986-5p	1.32	0.00
mmu-miR-377-5p	1.32	0.00
mmu-miR-1982-3p	1.32	0.00
mmu-miR-1264-3p	1.32	0.00
mmu-miR-7688-5p	1.32	0.00
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mmu-miR-539-5p	1.32	2.90
mmu-miR-490-5p	1.32	2.90
mmu-miR-376c-3p	1.32	0.00
mmu-miR-207	1.32	0.00
mmu-miR-1901	1.32	0.00
mmu-miR-761	1.32	0.00
mmu-miR-7007-3p	1.32	0.00
mmu-miR-5114	1.32	1.45
mmu-miR-504-3p	1.32	0.00
mmu-miR-467h	1.32	0.00
mmu-miR-3475-3p	1.32	1.45
mmu-miR-301a-5p	1.32	0.00
mmu-miR-1970	1.32	0.00
mmu-miR-154-3p	1.32	0.00
mmu-miR-1249-5p	1.32	0.00
mmu-miR-1191	1.32	0.00
mmu-miR-466h-5p	1.10	1.45
mmu-miR-499-5p	0.66	0.00
mmu-miR-665-3p	0.66	0.00
mmu-miR-195a-3p	0.66	0.00

mmu-miR-222-5p	0.66	0.00
mmu-miR-137-3p	0.66	2.90
mmu-miR-758-3p	0.66	1.45
mmu-miR-7019-3p	0.66	0.00
mmu-miR-370-5p	0.66	1.45
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mmu-miR-1968-5p	0.66	0.00
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mmu-miR-8117	0.66	0.00
mmu-mir-8095	0.66	0.00
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mmu-miR-6929-3p	0.66	0.00
mmu-miR-541-3p	0.66	0.00
mmu-miR-5129-3p	0.66	0.00
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mmu-miR-206-3p	0.66	0.00
mmu-miR-16-2-3p	0.66	2.90
mmu-miR-147-5p	0.66	0.00
mmu-miR-101c	0.66	1.45
mmu-miR-92a-1-5p	0.66	1.45
mmu-miR-879-5p	0.66	0.00
mmu-mir-8119	0.66	0.00
mmu-mir-8114	0.66	0.00
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mmu-mir-804	0.66	0.00
mmu-miR-7676-3p	0.66	0.00
mmu-miR-7671-3p	0.66	0.00
mmu-miR-7236-3p	0.66	0.00
mmu-miR-719	0.66	1.45
mmu-miR-7118-5p	0.66	0.00
mmu-miR-7116-3p	0.66	0.00
mmu-miR-7092-3p	0.66	0.00
mmu-miR-7084-5p	0.66	0.00
mmu-miR-7081-3p	0.66	0.00
mmu-miR-7073-5p	0.66	1.45
mmu-miR-7043-3p	0.66	1.45
mmu-miR-7036-3p	0.66	0.00
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mmu-miR-701-5p	0.66	0.00
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mmu-miR-6903-5p	0.66	0.00
mmu-miR-6899-3p	0.66	0.00

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mmu-mir-680-2	0.66	0.00
mmu-miR-679-3p	0.66	0.00
mmu-miR-675-5p	0.66	0.00
mmu-miR-652-5p	0.66	0.00
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mmu-miR-3103-3p	0.66	0.00
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mmu-miR-20b-3p	0.66	0.00
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mmu-miR-135b-5p	0.66	0.00
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mmu-let-7g-3p	0.66	0.00
mmu-miR-3100-5p	0.00	0.00
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mmu-miR-1224-5p	0.00	1.45
mmu-miR-7684-5p	0.00	0.00
mmu-miR-7013-5p	0.00	0.00
mmu-miR-697	0.00	0.00
mmu-miR-6963-3p	0.00	1.45

mmu-miR-669k-3p	0.00	0.00
mmu-miR-6418-3p	0.00	0.00
mmu-mir-6237	0.00	0.00
mmu-miR-532-3p	0.00	0.00
mmu-miR-491-3p	0.00	0.00
mmu-miR-483-3p	0.00	0.00
mmu-miR-3061-3p	0.00	0.00
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mmu-miR-187-3p	0.00	0.00
mmu-miR-153-5p	0.00	0.00

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mmu-miR-1192	0.00	7.97
mmu-miR-6369	0.00	0.00
mmu-miR-92a-2-5p	0.00	1.45
mmu-mir-882	0.00	2.90
mmu-mir-8113	0.00	1.45
mmu-miR-8101	0.00	1.45
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mmu-mir-8094	0.00	1.45
mmu-miR-7675-3p	0.00	1.45
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mmu-miR-7015-5p	0.00	1.45
mmu-miR-7009-3p	0.00	1.45
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mmu-miR-6941-5p	0.00	1.45
mmu-miR-6935-3p	0.00	1.45
mmu-miR-6929-5p	0.00	1.45
mmu-miR-6922-5p	0.00	2.90
mmu-miR-6919-5p	0.00	1.45
mmu-miR-6911-3p	0.00	2.90
mmu-miR-6903-3p	0.00	2.90
mmu-miR-6899-5p	0.00	1.45
mmu-miR-678	0.00	1.45
mmu-mir-678	0.00	1.45
mmu-miR-675-3p	0.00	2.90
mmu-miR-672-3p	0.00	1.45
mmu-miR-669f-3p	0.00	1.45
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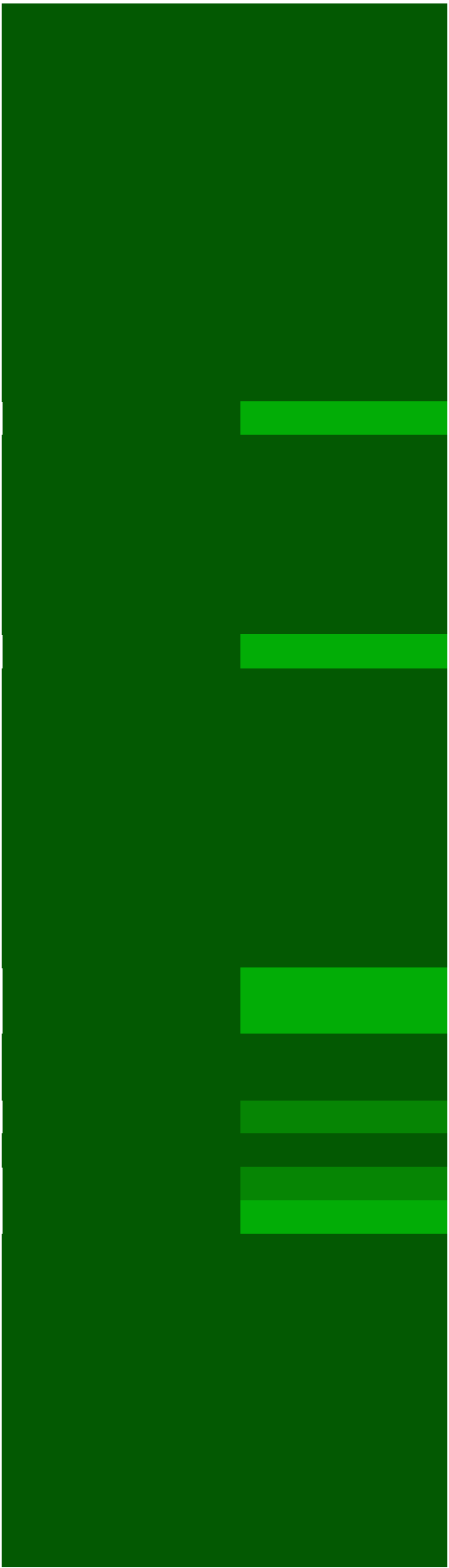
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mmu-miR-509-5p	0.00	1.45
mmu-miR-500-5p	0.00	1.45
mmu-miR-499-3p	0.00	1.45
mmu-mir-496b	0.00	1.45
mmu-miR-494-5p	0.00	2.90
mmu-miR-466n-5p	0.00	0.32
mmu-mir-451a	0.00	1.45
mmu-miR-449c-3p	0.00	1.45
mmu-mir-3965	0.00	1.45
mmu-mir-3962	0.00	1.45
mmu-miR-346-3p	0.00	1.45
mmu-miR-344e-3p	0.00	1.45
mmu-miR-3112-3p	0.00	1.45
mmu-miR-3067-3p	0.00	1.45
mmu-miR-3057-3p	0.00	1.45
mmu-miR-298-5p	0.00	1.45
mmu-miR-196a-2-3p	0.00	1.45
mmu-mir-1967	0.00	1.45
mmu-mir-1949	0.00	1.45
mmu-mir-1946a	0.00	1.45
mmu-miR-194-1-3p	0.00	4.35
mmu-miR-1930-5p	0.00	1.45
mmu-miR-190a-3p	0.00	1.45
mmu-miR-1902	0.00	2.90
mmu-miR-18a-3p	0.00	1.45
mmu-miR-1892	0.00	1.45
mmu-mir-145b	0.00	1.45
mmu-miR-137-5p	0.00	7.25
mmu-miR-135a-2-3p	0.00	1.45
mmu-miR-134-3p	0.00	1.45
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SI Table 3. miRNA heat map analysis of control (ob/+) and diabetic jejunum

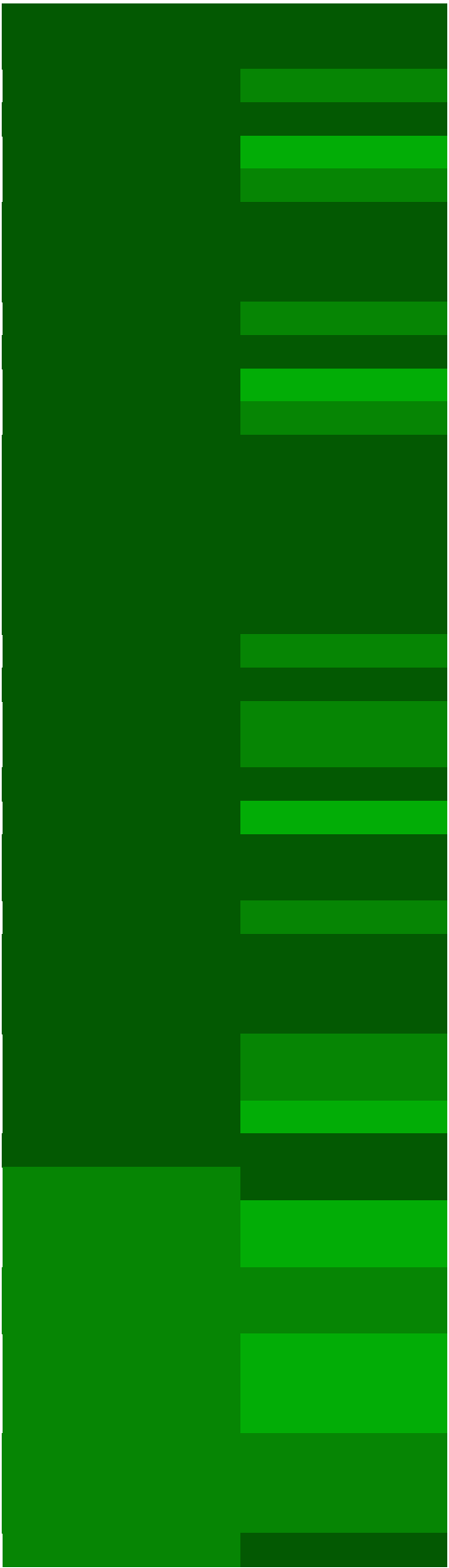




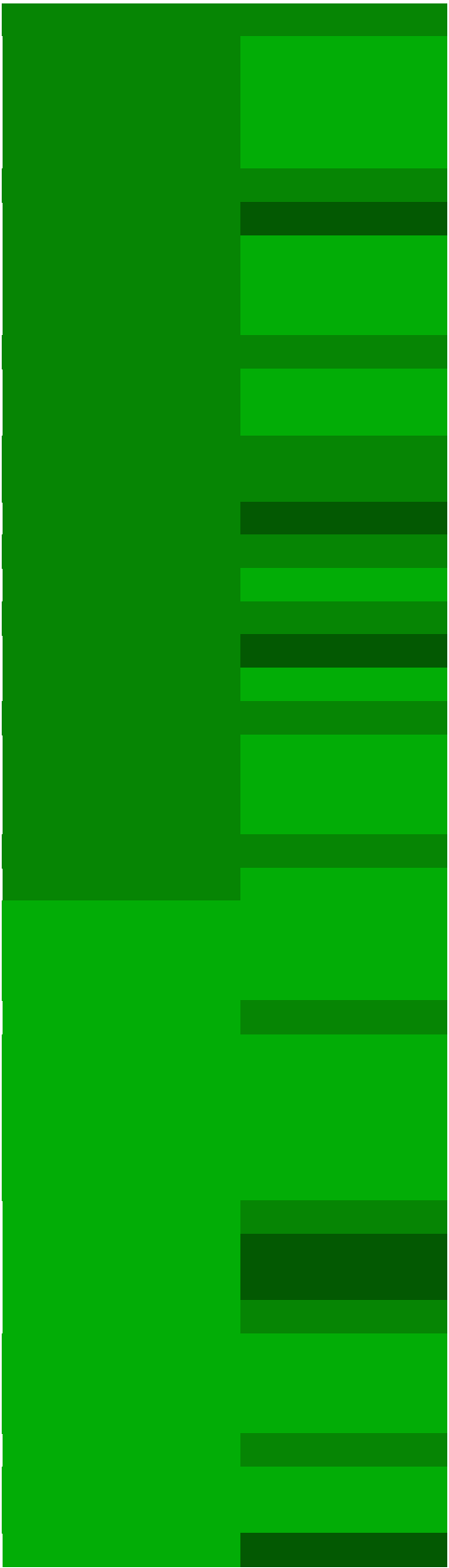
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mmu-miR-423-5p  
mmu-let-7j  
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mmu-miR-7a-5p  
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mmu-miR-222-3p  
mmu-miR-25-3p  
mmu-miR-335-3p  
mmu-miR-122-5p  
mmu-miR-382-5p  
mmu-miR-409-5p  
mmu-miR-652-3p  
mmu-miR-362-5p  
mmu-miR-3535  
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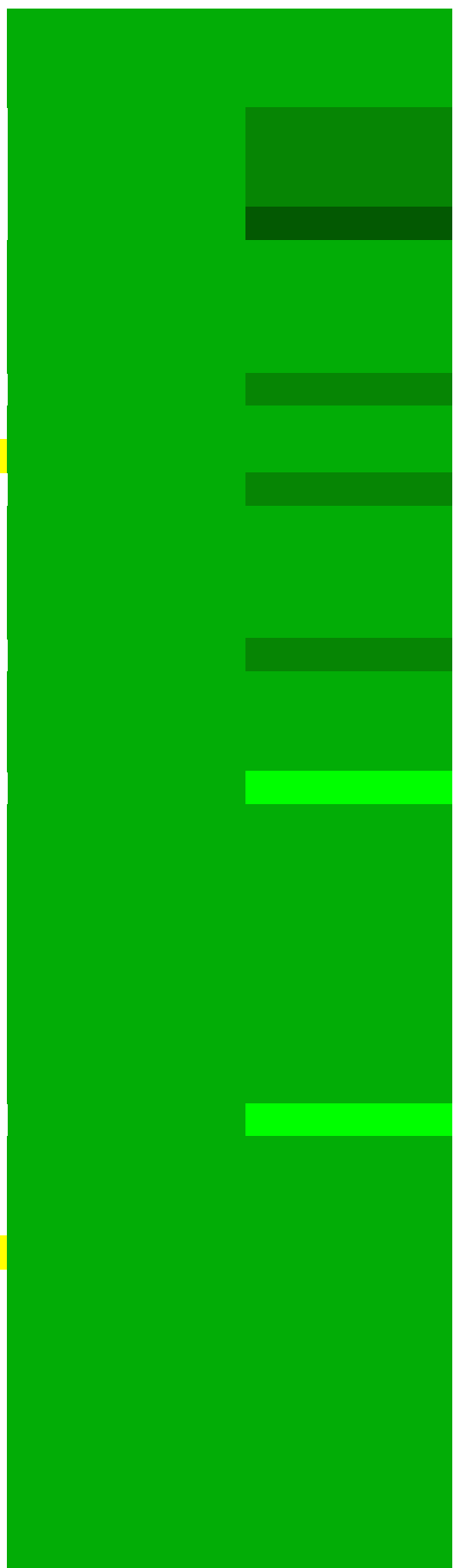
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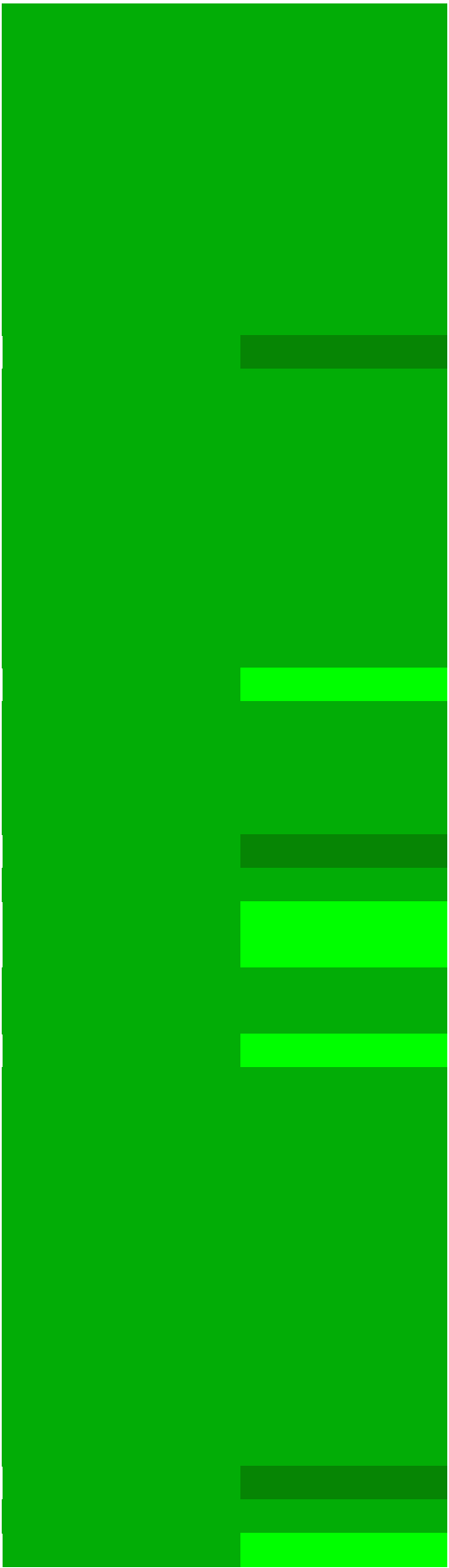
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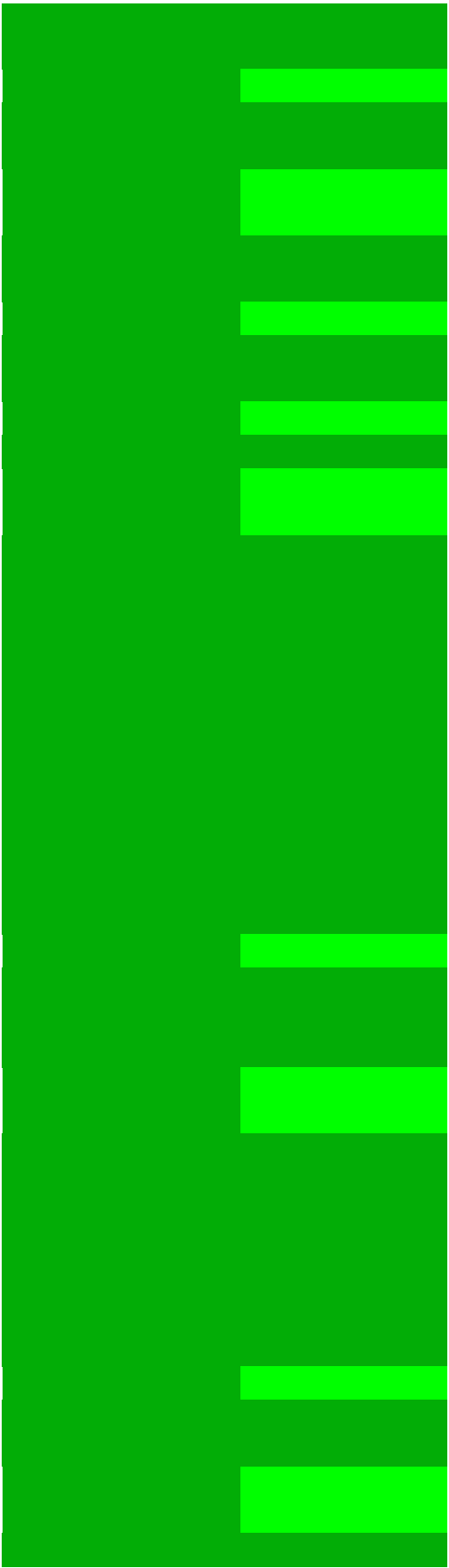
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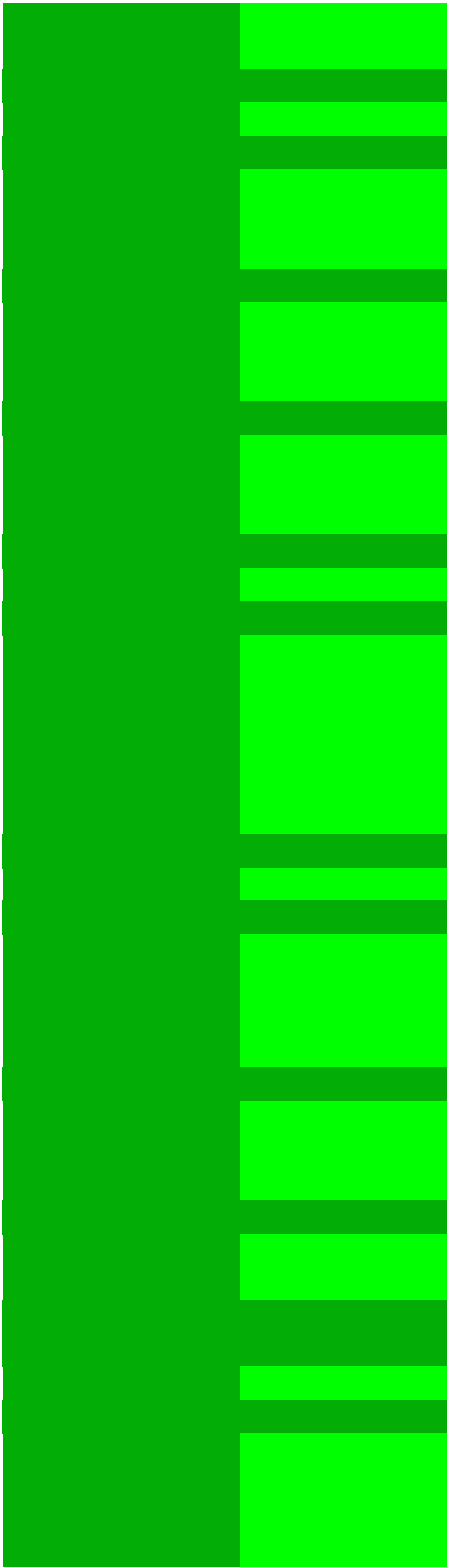


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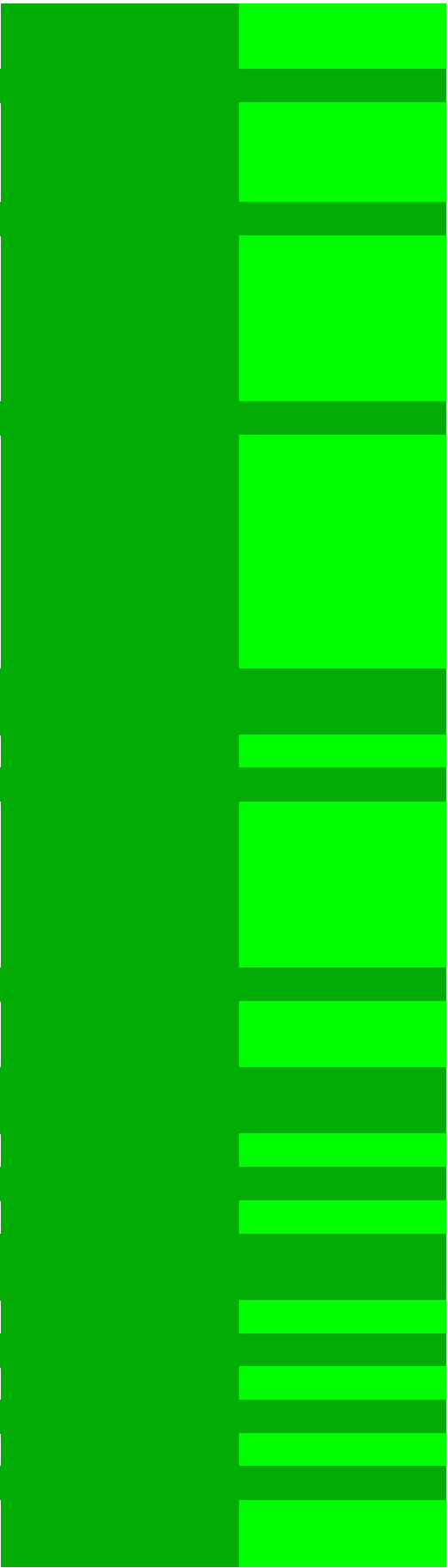
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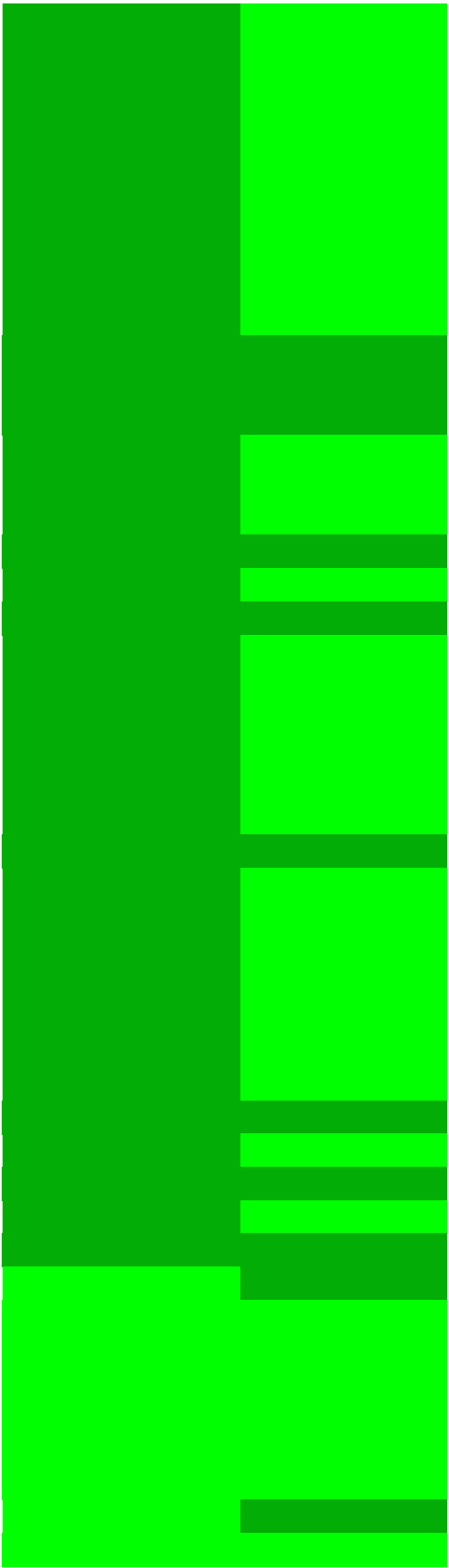


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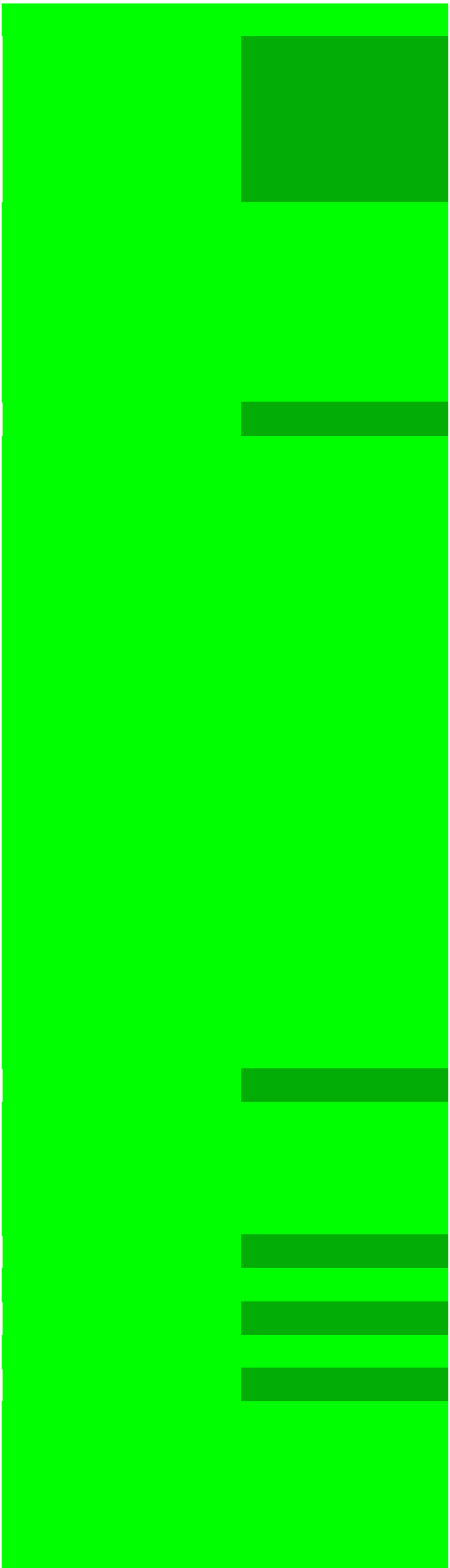


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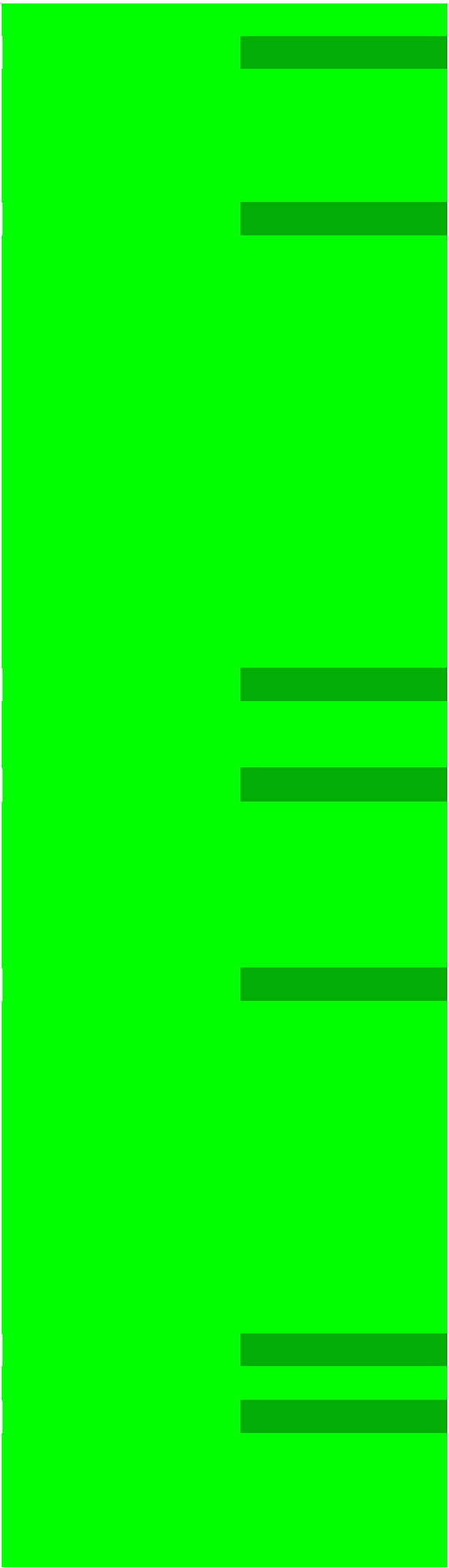
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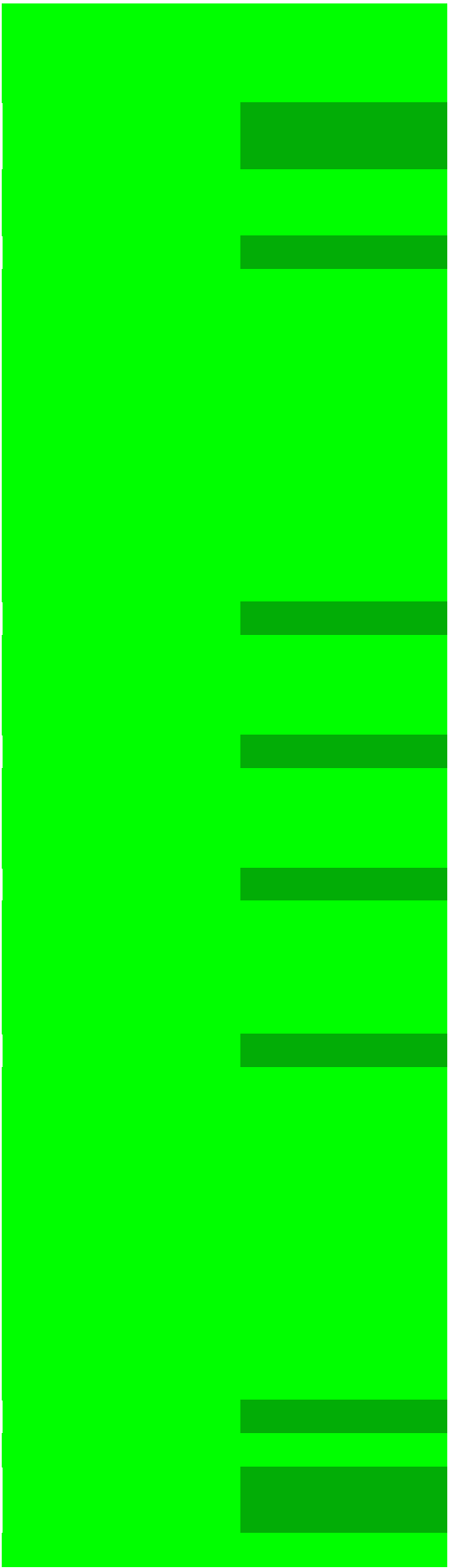
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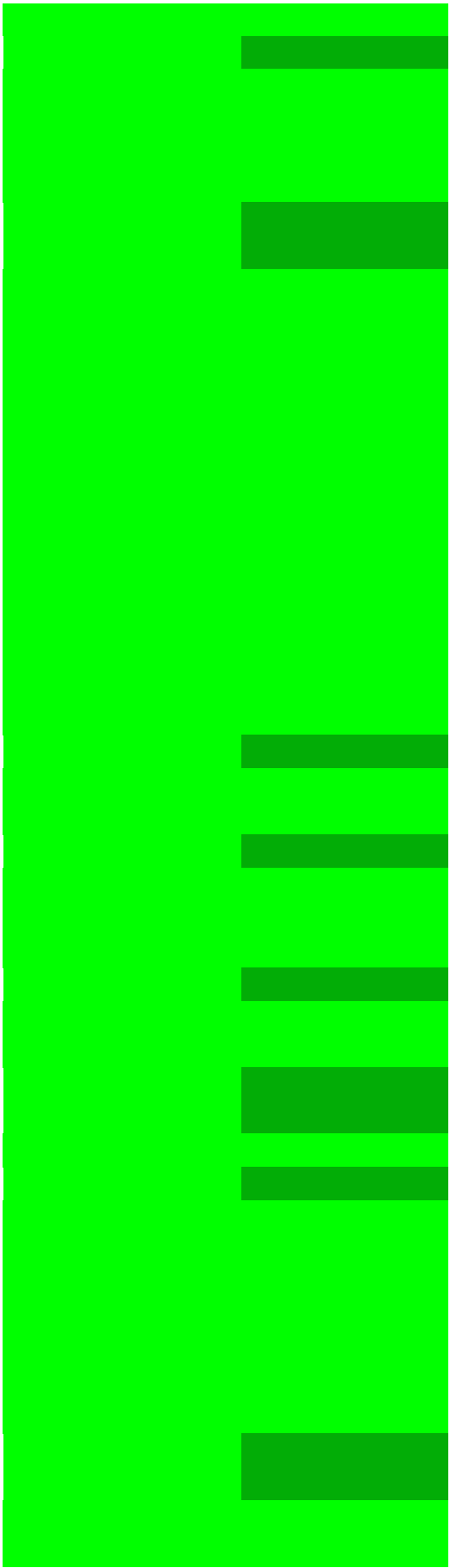
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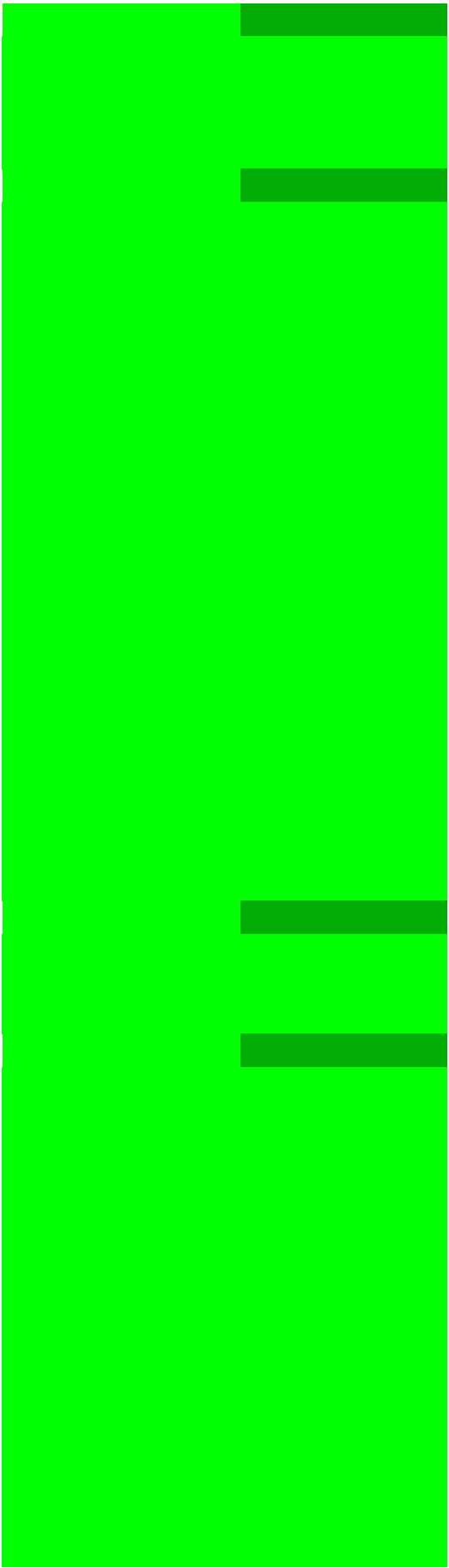


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mmu-miR-466l-3p  
mmu-miR-466m-3p  
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mmu-miR-467e-3p  
mmu-mir-467g  
mmu-miR-467h  
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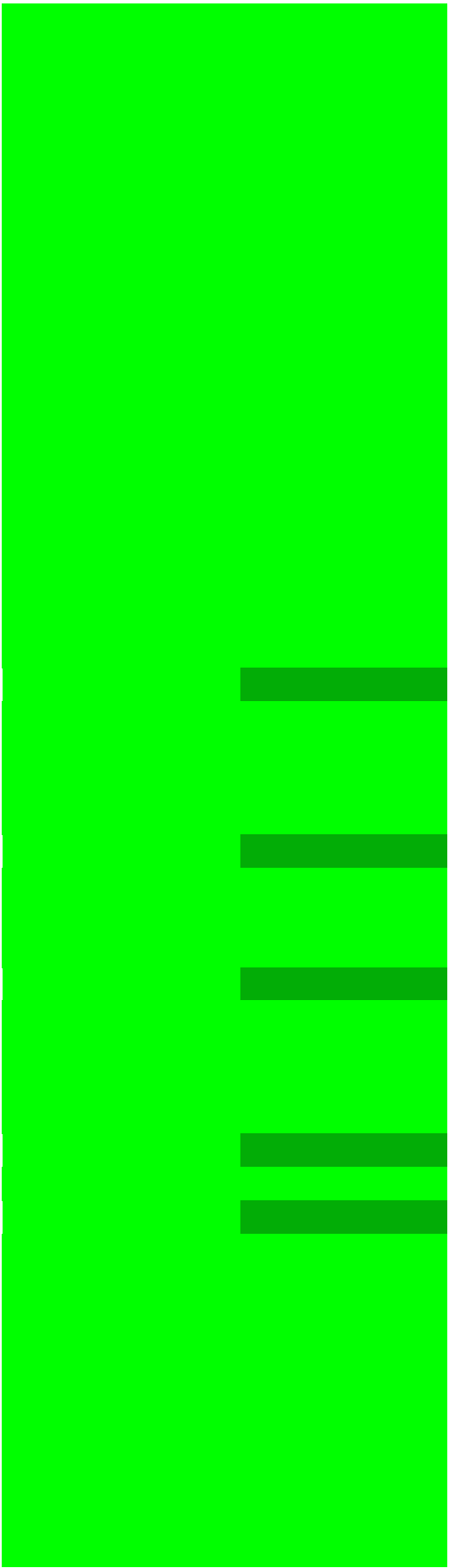




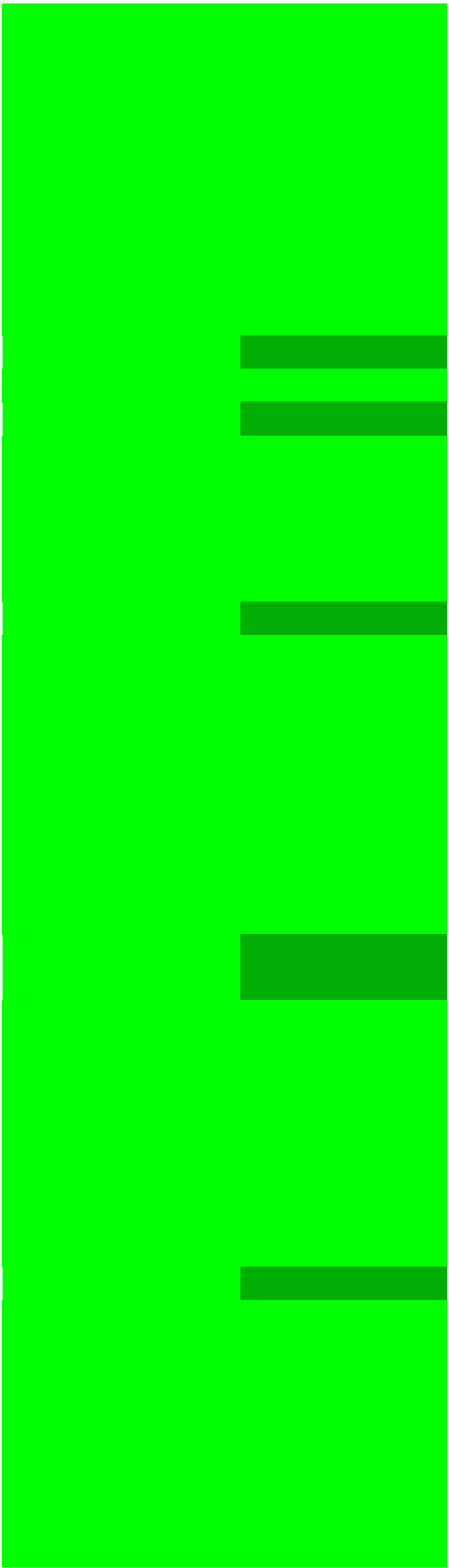
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mmu-miR-669f-3p  
mmu-mir-669j  
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mmu-miR-680



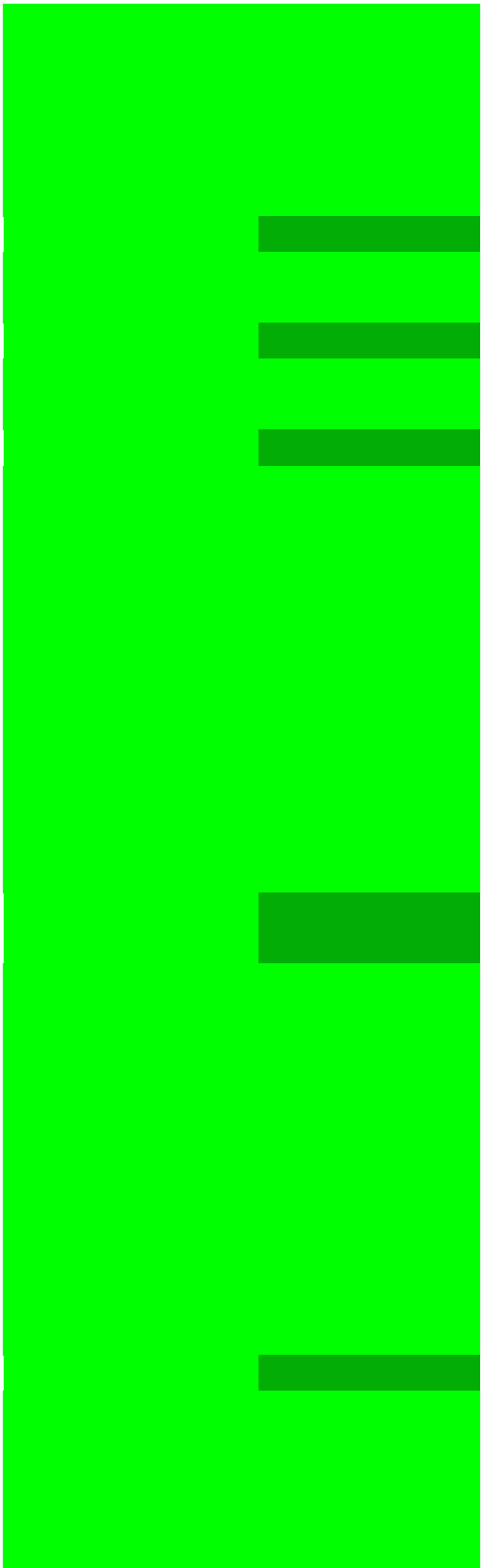
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mmu-mir-8115  
mmu-mir-8119  
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mmu-miR-879-5p  
mmu-mir-882  
mmu-miR-92a-1-5p  
mmu-miR-92a-2-5p  
mmu-miR-93-3p



log range	FPKM range
4.71-5	50,119.01-100,000
4.41-4.7	25,119.01-50,119
4.11-4.4	12,589.01-25,119
3.81-4.1	6,310.01-12,589
1.91-3.8	79.01-6,310
0.11-1.9	1.01-79
0-.1	0-1

SI Table 4. miRNA heat map analysis of control (ob/+) and diabetic colon

miR_name	norm_ob-plus_Colon	norm_ob-ob_Colon
mmu-miR-10b-5p		
mmu-miR-143-3p		
mmu-miR-125b-5p		
mmu-miR-145a-5p		
mmu-miR-10a-5p		
mmu-let-7c-5p		
mmu-miR-26a-5p		
mmu-miR-125a-5p		
mmu-let-7f-5p		
mmu-let-7a-5p		
mmu-let-7b-5p		
mmu-miR-23a-3p		
mmu-miR-99a-5p		
mmu-miR-30c-5p		
mmu-miR-191-5p		
mmu-miR-99b-5p		
mmu-miR-27b-3p		
mmu-let-7d-5p		
mmu-let-7g-5p		
mmu-miR-100-5p		
mmu-let-7i-5p		
mmu-miR-181a-5p		
mmu-miR-24-3p		
mmu-miR-23b-3p		
mmu-miR-145a-3p		
mmu-miR-541-5p		
mmu-miR-127-3p		
mmu-miR-30d-5p		
mmu-miR-455-3p		
mmu-miR-26b-5p		
mmu-miR-196b-5p		
mmu-miR-378a-3p		
mmu-miR-22-3p		
mmu-miR-199b-3p		
mmu-miR-199a-5p		
mmu-miR-30b-5p		
mmu-miR-29a-3p		
mmu-miR-335-5p		
mmu-miR-181b-5p		
mmu-let-7e-5p		
mmu-miR-30e-5p		
mmu-miR-143-5p		
mmu-miR-30a-5p		
mmu-mir-6236		
mmu-miR-16-5p		

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mmu-miR-151-5p  
mmu-miR-146a-5p  
mmu-miR-21a-5p  
mmu-miR-221-3p  
mmu-miR-92a-3p  
mmu-miR-103-3p  
mmu-let-7j  
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mmu-miR-351-5p  
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mmu-miR-434-3p  
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mmu-miR-186-5p  
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mmu-miR-139-5p  
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mmu-miR-574-3p  
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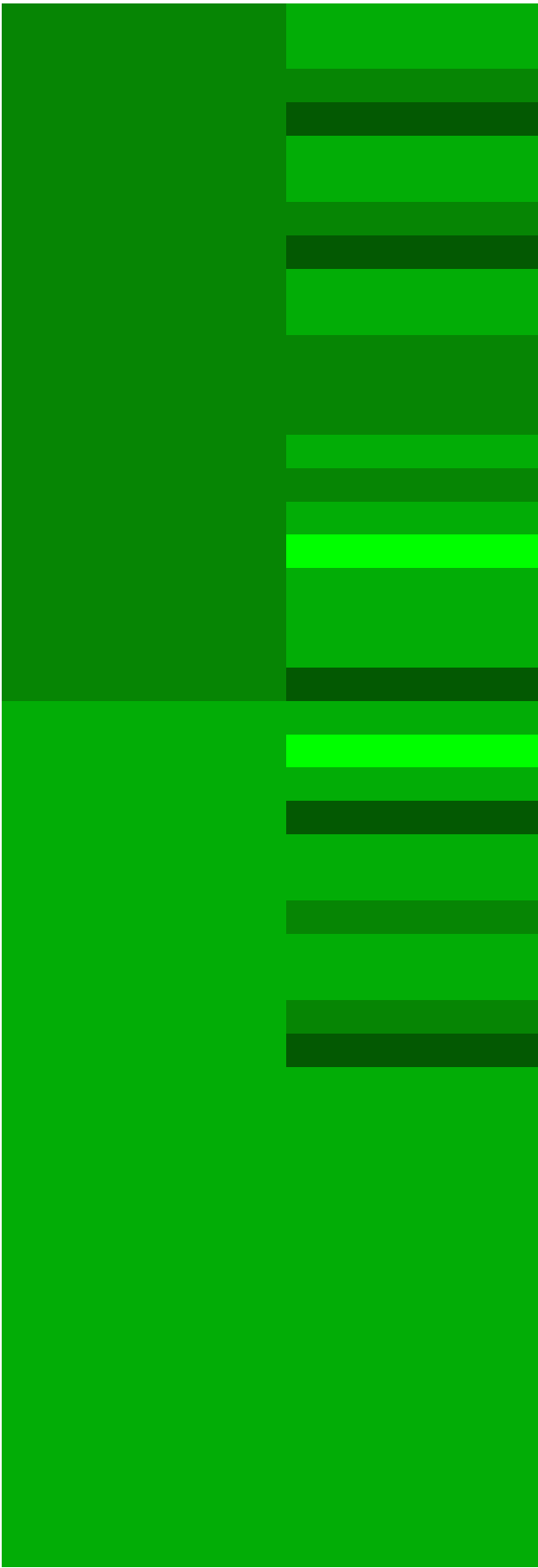


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mmu-miR-330-3p





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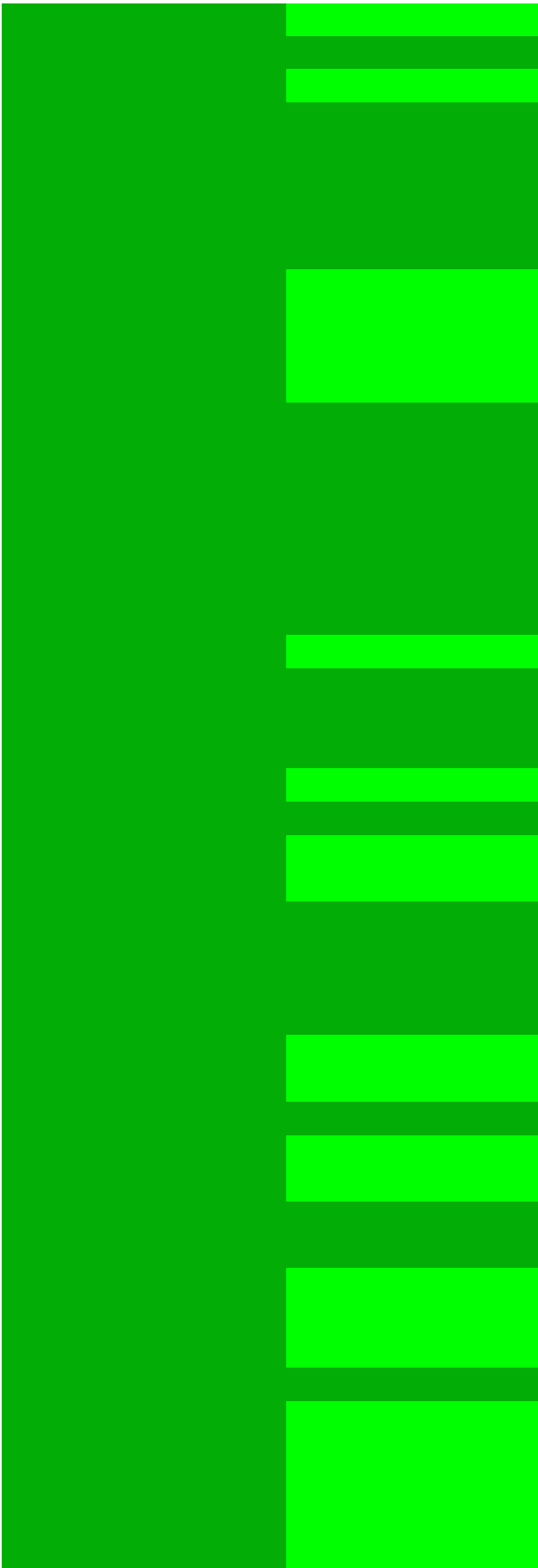
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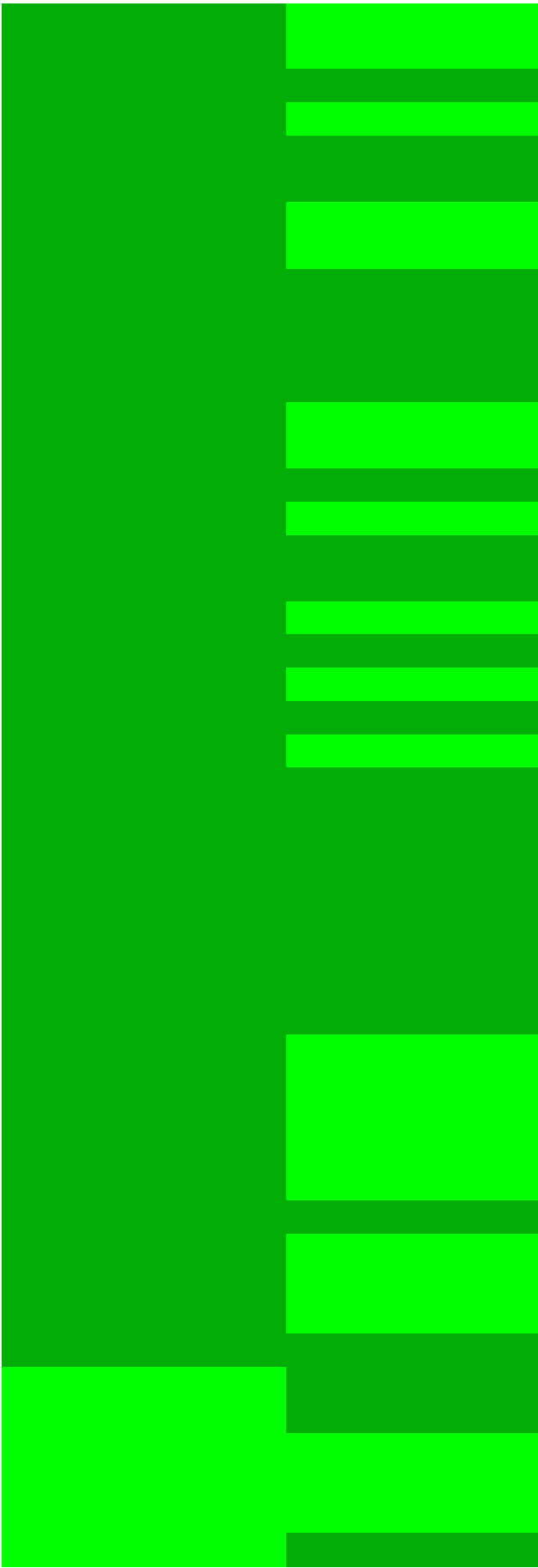


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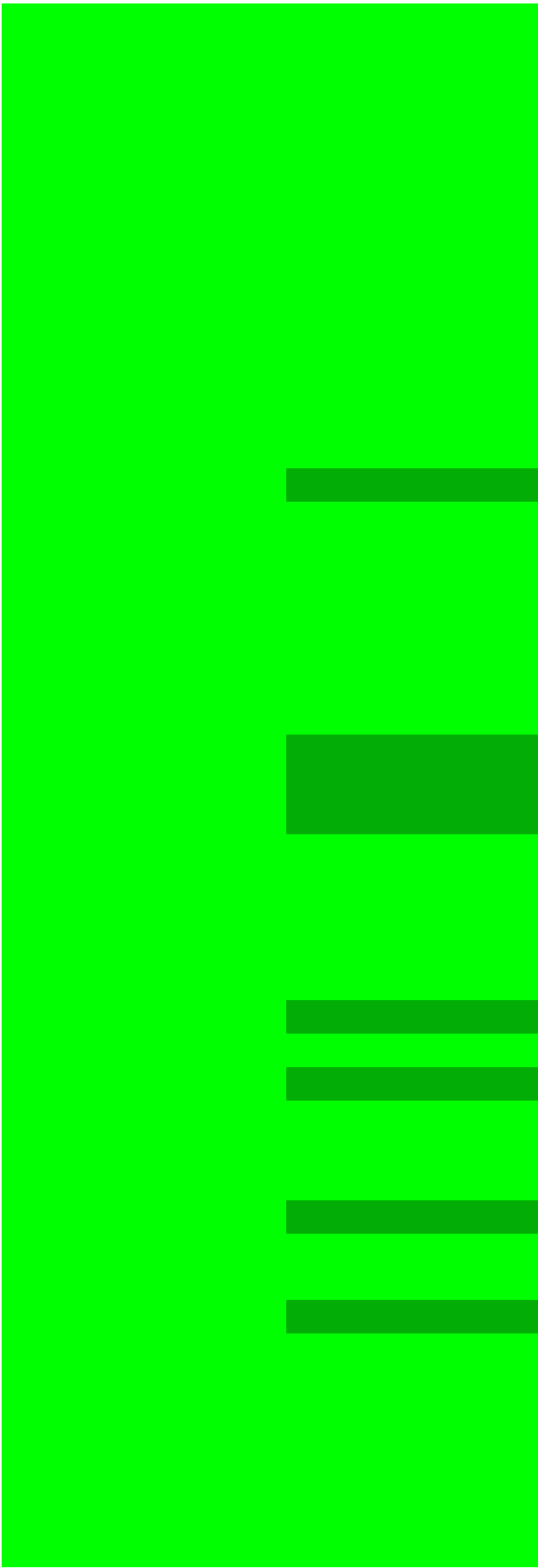


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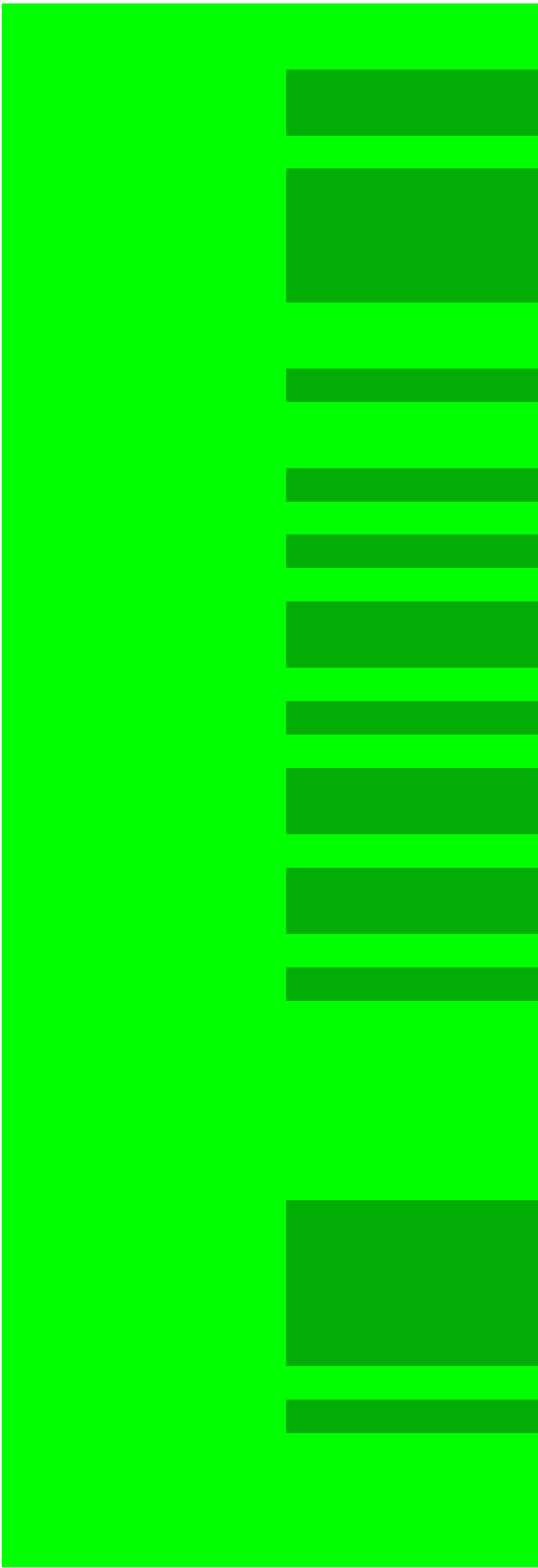


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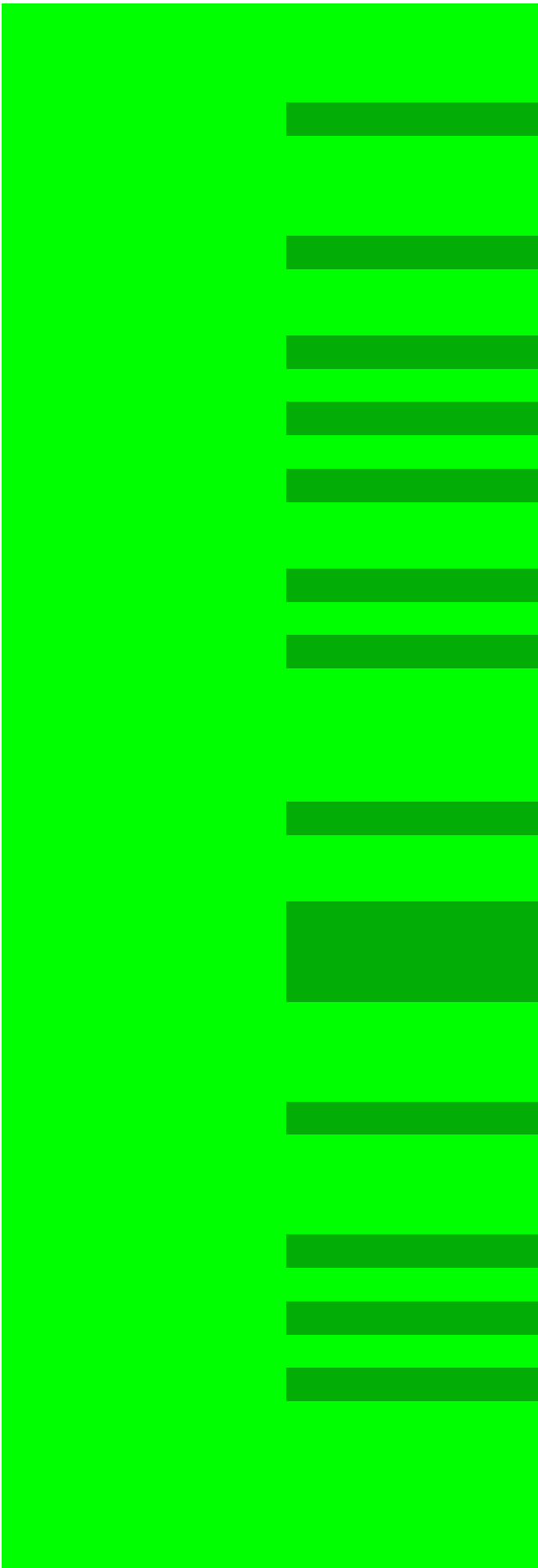
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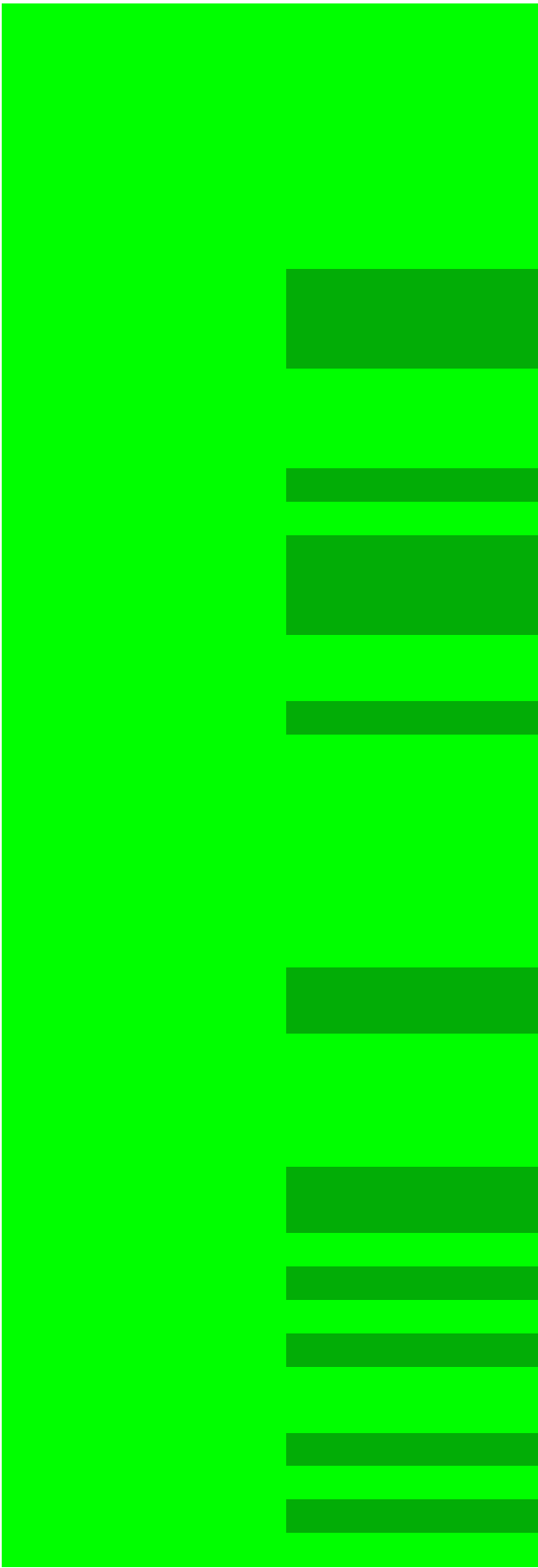
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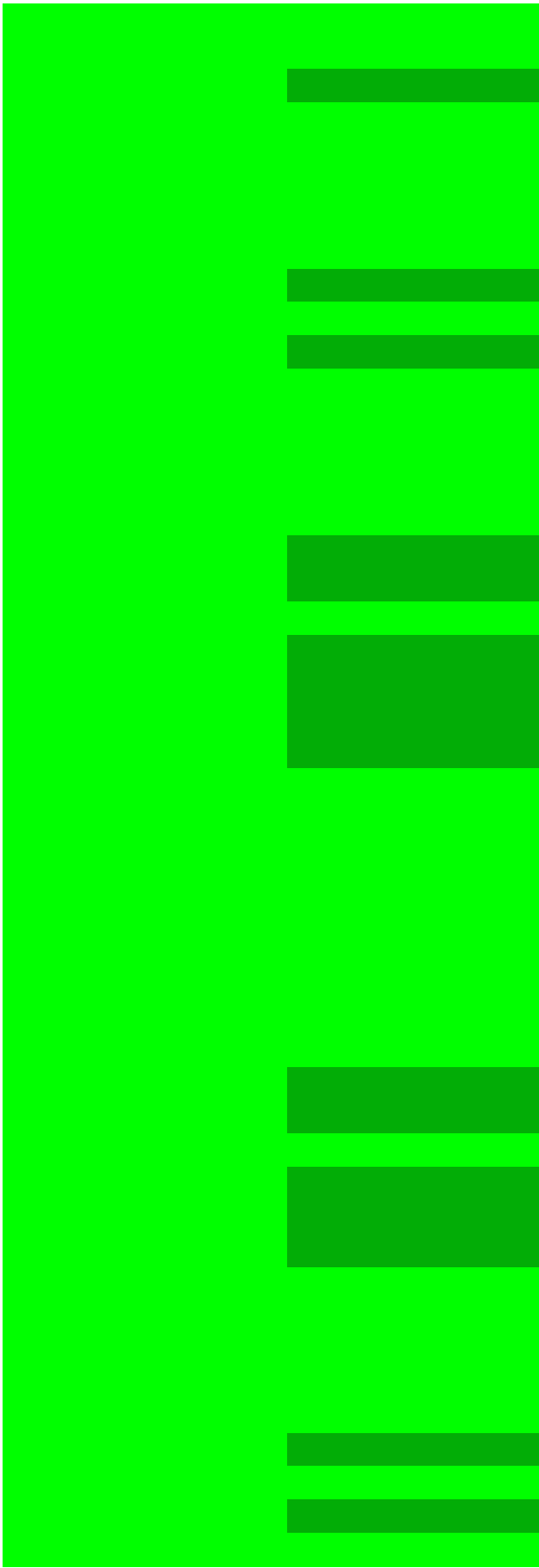
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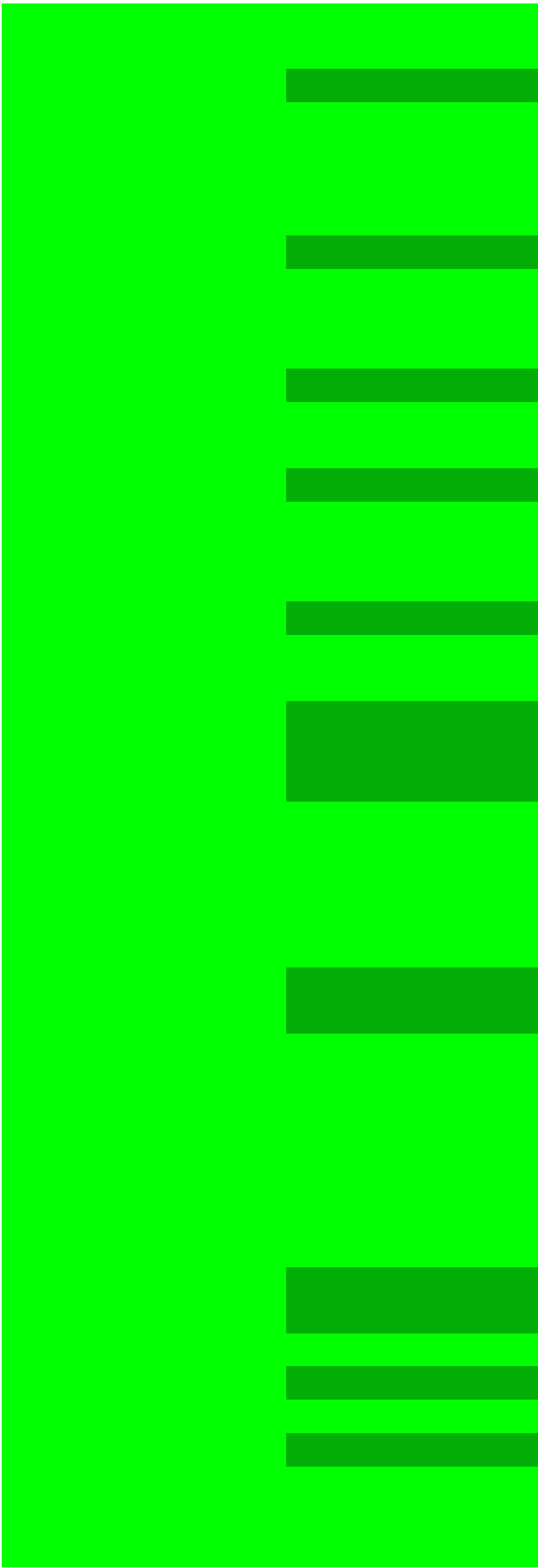


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